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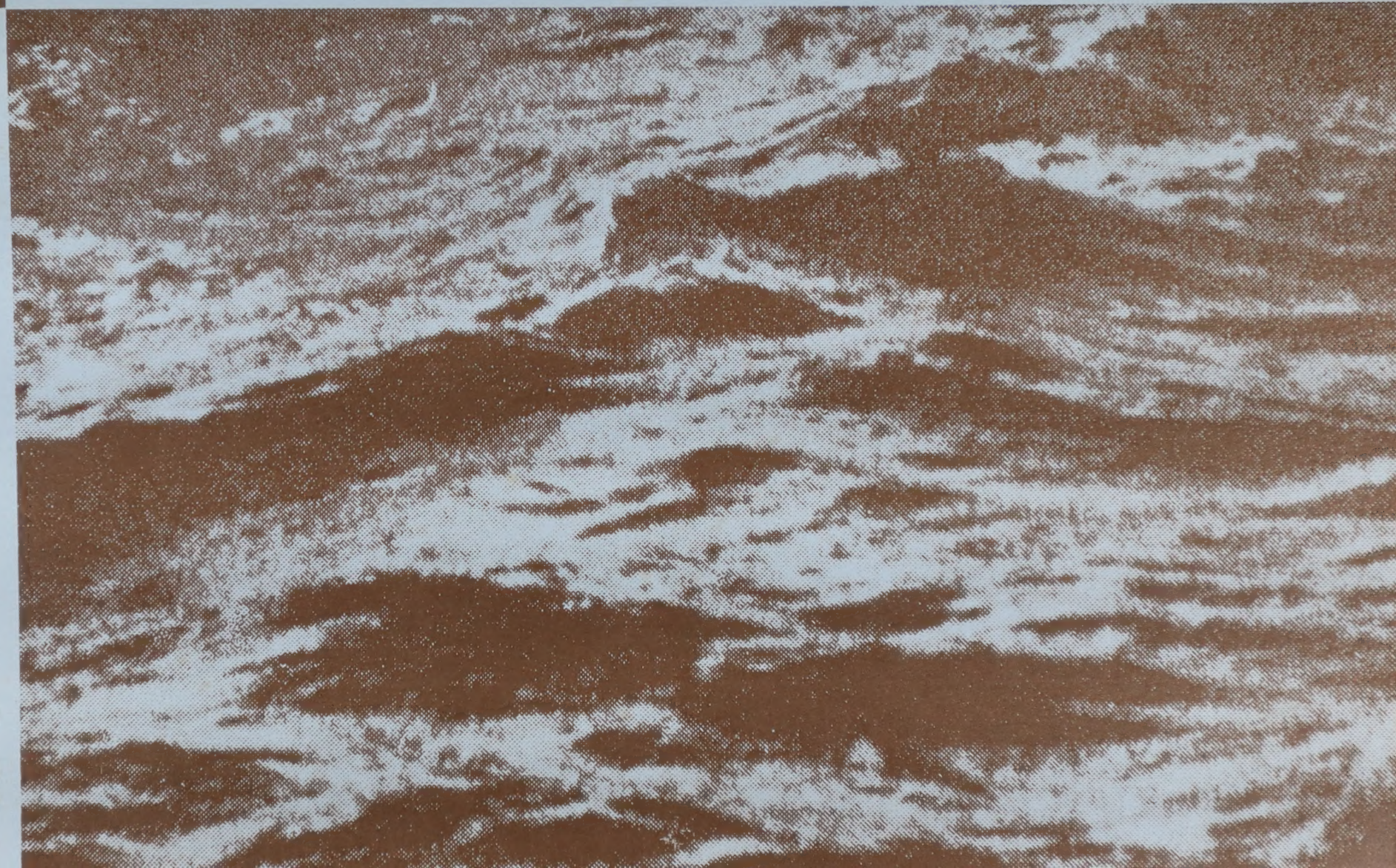

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UNITED STATES DEPARTMENT OF COMMERCE
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FOREWORD

The Department of Commerce's National Marine Fisheries Service publishes the monthly journal *Commercial Fisheries Abstracts* as one means of communicating to the fishing industry and allied groups the status of current fishery research. The research includes the biological aspects of fishery science as well as technological studies dealing with aquatic resource supply, harvesting, processing, utilization, and distribution.

Commercial Fisheries Abstracts contains summaries of selected articles from trade, engineering, and scientific journals dealing with the entire spectrum of fishery science. The publication is designed to serve the needs of fishery scientists, engineers, and managers in industry, academic institutions, and government by supplying timely information on current progress in fishery research and technology.

0.32 MEMBRANE STRUCTURE PROTEINS

Kaplan, David M., and R. S. Criddle (Department of Biochemistry, University of California, Davis, Calif.)
Physiological Reviews 51, No. 2, 249-272 (April 1971)

Controversy surrounding the problem of the fundamental structure of biological membranes still exists today because the information available on membrane structure is not yet adequate to describe and explain many of the phenomena ascribed to them. For this review, the membrane structural proteins are defined as the residue of insoluble proteins left after all readily soluble (or dissociable) protein species have been removed by washing or solubilized with the aid of dilute chaotropic agents. The authors suggest that the structural proteins may play an active role in (1) defining binding sites that determine the spatial relationships of enzymes participating in reaction sequences and (2) undergoing conformational changes via energized states to control and participate in active transports, and (3) determining the architecture of particular areas of the membrane by contributing specific regions for adsorption of lipid, carbohydrate, and RNA to the protein matrix.

In this review, the authors first discuss techniques currently used for working with structural proteins in order to outline the major experimental difficulties and limitations encountered in their study. Then, they give a review of the current literature illustrating progress (or "state of the art") relative to membrane structural proteins. This treatment of the subject area was made so that the reader might obtain a more meaningful evaluation of the data presented.
[81 references] FTP

0.321 (0.35) COMPARISON OF MYOGLOBINS FROM HARBOR SEAL, PORPOISE, AND SPERM WHALE. VII. MECHANISM AND CATALYSIS FOR ADDITION OF CYANIDE TO MYOGLOBINS

Ver Ploeg, Dan A., Eugene H. Cordes, and Frank R. N. Gurd (Department of Chemistry, Indiana University, Bloomington, Ind. 47401)
Journal of Biological Chemistry 246, No. 9, 2725-2733 (May 10, 1971)

This paper is the 43rd in a series dealing with coordination complexes and catalytic properties of proteins and related substances [see R. H. L. Marks, E. H. Cordes, and F. R. N. Gurd, Journal of Biological Chemistry 246, 466 (1971)]. Apparently, sperm whale ferrimyoglobin provides an excellent material for the study of kinetics and mechanism for the binding of small molecules and ions to proteins. The addition of ligands to ferrimyoglobin offers a set of kinetically well-behaved reactions deriving from and leading to products of well-established structure; also, the structures of both species may be modified, either through change of reactants or through chemical modifications, in a flexible way. This study involved the examination of the use of various buffers as catalysts for cyanide addition to several varieties of myoglobin at several values of pH. Also, the kinetics of the dissociation of the complex was probed, including the deuterium solvent isotope effect on the velocity of the association reaction.

Earlier work had established the pH rate profile for uncatalyzed formation of a complex between cyanide and sperm whale ferrimyoglobin at 25° C. and total ionic strength of 0.11 over the pH range of from 5 to 11 using an integrated reversible second order rate equation of general applicability. Three important routes for complex formation are involved: (1) addition of a cyanide ion to an

 (over)

0.35 (0.321) REDOX EQUILIBRIUM OF SPERM-WHALE MYOGLOBIN, APLYSIA MYOGLOBIN, AND CHIRONOMUS THUMMI HEMOGLOBIN

Brunori, Maurizio (Institute of Biochemistry, University of Rome, the C. N. R. Centre for Molecular Biology, Rome, and the Regina Elena Institute for Cancer Research, Rome, Italy), Ughetta Saggese, Giacomo C. Rotilio, Eraldo Antonini, and Jeffries Wyman
Biochemistry 10, No. 9, 1604-1609 (April 27, 1971)

A significant biochemical problem relates to the understanding of the structural factors which determine the free energy of electron exchange in heme protein complexes. Oxidation-reduction potentials can vary by as much as several hyndred millivolts between proteins containing the same prosthetic group. The redox potential, therefore, of protoheme may be shifted either postively or negatively as a result of interaction with a specific apo protein.

The present work consisted of a study of the oxidation-reduction properties of three heme proteins, sperm-whale myoglobin, Aplysia myoglobin, and Chironomus thummi hemoglobin. These heme proteins are characterized by the standard electrode equation, the value of n in the electrode equation being one in all cases.
[7 figures, 2 tables, 29 references] FTP

0.38 (0.5) ENZYME SYSTEM INVOLVED IN THE DECOMPOSITION OF PHENYL MERCURIC ACETATE BY MERCURY-RESISTANT PSEUDOMONAS

Furukawa, Kensuke, and Kenzo Tonomura (Fermentation Research Institute, Inage, Chiba, Japan)
Agricultural and Biological Chemistry 35, No. 4, 604-610 (April 1971)

This paper reports on a study of the enzymatic decomposition of phenyl mercuric acetate to metallic mercury by a mercury-resistant strain of Pseudomonas. By means of gel filtration on a column of Sephadex G-150 the following were separated from a cell-free extract of the Pseudomonas: glucose dehydrogenase, arabinose dehydrogenase, cytochrome c, and the "decomposing enzyme" (which catalyzes the splitting of the C-Hg linkage). The cytochrome fraction was further separated into two types (termed c-I and c-II). The authors found that, in reconstructing the enzymes, a reduced NAD(P) generating system, glucose dehydrogenase or arabinose dehydrogenase, cytochrome c-I, and the "decomposing enzyme" were required for the decomposition of phenyl mercuric acetate.
[8 figures, 1 table, 5 references] FTP

0.321 (0.35)

unprotonated myoglobin, (2) addition of hydrocyanic acid to the unprotonated myoglobin, and (3) addition of hydrocyanic acid to the protonated myoglobin. Formation of the ferrimyoglobin-cyanide complex is accelerated by buffers: catalysis is most evident at intermediate pH values and becomes negligible below pH 6 and above pH 10. Phosphate, glycine, and cyanide are effective buffers.

The rate of complex formation between cyanide and ferrimyoglobins from pilot whale, porpoise, and harbor seal is also subject to catalysis by certain buffers. The authors found that guanidination of sperm whale ferrimyoglobin and carboxymethylation in the crystalline state have only small effects on the reactivity of the ferrimyoglobin toward cyanide or on the sensitivity of the reaction to catalysis by buffers. However, carboxymethylation in solution markedly reduced the reactivity of the protein to cyanide. The authors hypothesize that the buffer-binding site may lie between arginine-45 and histidine-64.

[4 figures, 5 tables, 25 references] FTP

0.38 (8.59)(1.92) CARP MUSCLE CATHEPSINS

Takahashi, Toyoo, and Masakatsu Yamasawa (Lab. Food Chem., Tokyo Univ. Fish., Tokyo, Japan)
Chemical Abstracts 74, No. 17, 83351s (April 26, 1971)

0.37 ICELIKE CELL WATER SHAKES BIOTHEORIES

Anonymous
Scientific Research 4, No. 13, 9-10 (June 23, 1969)

Researchers at the U.S. Naval Air Development Center, Johnsville, Pennsylvania, and at the Texas Children's Hospital of the Baylor University College of Medicine, Houston, Texas, have independently discovered that most of the water in muscle and brain tissue is in a semicrystalline, or icelike, state. The conventional theory of membrane transport rests on the assumption that cell water is a liquid containing free sodium and potassium ions, and an ion "pump" pumps sodium ions against the sodium ion concentration gradient. This assumption requires that the energy for driving the pump and overcoming the normal leakage of ions amount to about 350 percent of the total energy generated by the cell. Such a discrepancy can be avoided if tissue water is treated as a solid-state system, the researchers believe.

During the experiments that led to formation of this new concept, the steady-state NMR (nuclear magnetic resonance) spectrum of deuterium was found to be much lower in muscle water than in liquid water; also, the NMR signal was much broader for muscle water than for liquid water, and the NMR relaxation times were markedly different. In addition to these findings, both laboratories have evidence suggesting the existence of a second fraction of tissue water having an even shorter relaxation time, and even more structure, than the semicrystalline water. They hypothesize that the two fractions of tissue water may consist of multiple subfractions having varying degrees of crystallinity. LB

0.38 (6.32) STUDIES ON THE SULFITE REDUCING SYSTEM OF ALGAE
PART II. PURIFICATION AND PROPERTIES OF THE REDUCED METHYL VIOLOGEN-LINKED SULFITE REDUCTASE FROM A RED ALGA, PORPHYRA YEZOENSIS

Saito, Eizo, and Goro Tamura (Department of Agricultural Chemistry, Faculty of Horticulture, Chiba University, Chiba, Japan)
Agricultural and Biological Chemistry 35, No. 4, 491-500 (April 1971)

Using reduced methyl viologen as an electron donor, the enzyme sulfite reductase was purified about 94-fold from the red alga Porphyra yezoensis. The optimum pH for the enzyme was about 7.5; the Km for sulfite was 6.5×10^{-4}M. The purified enzyme showed its absorption maximum at 385 mμ and an intense peak at 278 mμ. The enzyme molecule probably contains iron and copper.

[8 figures, 4 tables, 26 references] FTP

0.39 (0.7) METALS AS CONSTITUENTS OF ENZYMES

Anonymous
Nutrition Reviews 29, No. 4, 97-100 (April 1971)

There are few areas where the interrelationships of nutrition and biochemistry become more apparent than in studies of the biological role of metals. Organisms derived of a particular metal have often provided the first clue that the metal is essential for structure or activity of a particular enzyme.

Abstract reprinted

0.35 STUDIES OF INVERTEBRATE FIBRINOGEN. II. TRANSFORMATION OF LOBSTER FIBRINOGEN INTO FIBRIN

Fuller, G. M. (present address: Department of Human Genetics, University of Texas Medical School, Galveston, Tex. 77550), and R. F. Doolittle
Biochemistry 10, No. 8, 1311-1315 (April 13, 1971)

Evidence is presented that the fundamental chemistry of the formation of fibrin in the lobster is the same as that in the final stage of vertebrate fibrin reinforcement, involving the condensation of glutaminyl and lysine side chains to form ϵ-(γ-glutamyl)lysine cross bridges. Furthermore, the authors confirmed earlier notions that limited proteolysis is not involved in lobster fibrin formation by demonstrating that there is no change in amino-terminal residues during the fibrinogen-fibrin conversion.

[3 figures, 2 tables, 21 references] FTP

0.38 (0.6) FOOD ENZYMES

De Becze, George I. (St. Thomas Institute, Cincinnati, Ohio)
CRC Critical Reviews in Food Technology 1, No. 4, 479-518 (December 1970)

The reviewer defines, characterizes, and classifies enzymes in terms of their nature and mode of action, occurrence, manufacture, nomenclature, and significance in food preparation. Commercially marketed food enzymes, their sources, applications, units, and assay methods are discussed, as are the sources and usefulness of the reviewer's information. His conclusion is that food enzymology, because of its importance and advanced stage, should be considered independently from other branches of enzymology or food technology.

[2 tables, 153 references] LB

0.38 OCCURRENCE OF A NEW ENZYME REDUCING METMYOGLOBIN IN DOLPHIN MUSCLE

Shimizu, Chiaki, and Fumio Matsuura (Laboratory of Marine Biochemistry, Faculty of Agriculture, The University of Tokyo, Tokyo, Japan)
Agricultural and Biological Chemistry 35, No. 4, 468-475 (April 1971)

The paper reports the discovery of a new enzyme in the muscle of the blue white dolphin (Stenella caeruleo alba). The enzyme was purified and prepared in the crystalline state. It resembles methemoglobin reductase in that it reduces metmyoglobin, ferric cytochrome c, and methemoglobin. However, the two enzymes are distinctly different with respect to sedimentation coefficient, diffusion coefficient, frictional ratio, pH mobility curve, and the specific activity of reducing metmyoglobin, ferric cytochrome c, and methemoglobin. The authors suggest the name metmyoglobin reductase for the enzyme.
[7 figures, 3 tables, 10 references] FTP

0.4 USEFUL 'RED TIDE'
(2.9)

Anonymous
Oceanology International 6, No. 4, 29 (April 1971)

Dr. Dean F. Martin, of the University of South Florida's Chemistry Department, and Dr. George M. Padilla, of the Duke University Medical Center, have discovered that the fish-killing toxin produced by Gymnodium breve (the organism that causes "red tides") may prevent hemolysis by interacting with Prymnesium parvum, another red tide organism. They believe that their work on both toxins may lead to (1) an understanding of how membrane processes occur, particularly those basic to blood chemistry, and (2) possible uses of marine toxins as source material for drugs that will cure blood infections for which no satisfactory medicines have yet been found. The long-term goals of their research program is to discover conditions that favor the organisms' growth, to determine the chemical and biochemical properties of the toxin they produce, and to learn how to lessen the effect of that toxin. LB

0.4 A DRUG FOR BENDS
(2.12)

Anonymous
Oceanology International 6, No. 5, 18-19 (May 1971)

During decompression, a diver's blood vessels constrict, inhibiting the escape of gas from his tissues and, thus, making it likely that gas bubbles will form in his blood stream--in other words, that he will get the bends. Researchers at the Beth Israel Medical Center in New York, under contract to the Office of Naval Research, have discovered a drug that prevents the bends in animals. Using a strain of obese mice particularly susceptible to decompression sickness, they injected 2-4 phenylpiperazinylmethyl cyclohexanone into one group before it and a control group were exposed to high atmospheric pressure. Following rapid decompression, the injected group did not develop the bends; the control group did. Later examination showed that mice in the control group had tissues bloated with gas, whereas those in the injected group had gas-free tissues.

Dr. C. Chryssanthou, director of the research program, notes that part of the decompression disease mechanism may be the action of substances in the body that stimulate such smooth muscles as those in blood vessels. One such substance is bradykinin, which tends to contract smooth muscles. During compression-decompression, a substance (previously undetected) contained in the lung tissues of mice, rabbits, and humans seems to be released or activated. This substance (which Dr. Chryssanthou calls the smooth muscle activating factor) sensitizes the smooth muscles so they are receptive to the stimulus of bradykinin or histamine. The activating factor, too, causes smooth-muscle contraction.

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0.6 FLAVOR TECHNOLOGY 1971
(9.6)

Pintauro, N. D.
Published by Noyes Data Corporation, Noyes Building, Park Ridge, N.J. 07656, 225 pp. (1971), Price $35.

A brochure from the Corporation stated that this book contains hard-to-get information on flavor technology. The table of contents is listed as follows (the two sections on meat, only, are listed here in greater detail): Spice Technology (11); Peppermint and Citrus Oil Processes (11); Fruit Essences and Flavors (9); Dairy Flavors (6); Bread Flavors (8); Vanilla Processes (9); Meat Flavor Technology (17) (Amino acids for meat flavor, ascorbic acid--cysteine, Flavors from protein hydrolyzates); Meat Seasonings and Flavor Enhancers (10) (Glutamates, Glutamates and polypeptides, Synergists with tricholomic and ibotenic acids, Rice-soy fermentation mixture, Hickory smoke process, Imitation smoke process); Fixation Technology (18). The number in parenthesis after the title of each chapter indicates the number of processes described in each chapter. FTP

0.4 (2.12)

Whether the antibradykinin, antihistaminic drug being used to counteract the effects of the activating factor actually interacts chemically with that factor or somehow conditions the body to resist its action is as yet unknown. The researchers are attempting to determine the drug's mechanism of action, its side effects, and its possible use for human divers--for example, how long before a dive it should be administered. The findings, in addition to showing how to prevent the bends, should provide a better understanding of the mechanism of the body under various conditions of pressure. LB

0.6 FABRICATED FOODS

Glicksman, Martin (Corporate Research Department, General Foods Corp., Tarrytown, N.Y.)
CRC Critical Reviews in Food Technology 2, No. 1, 21-43 (April 1971)

The reviewer covers the needs for and the definitions, advantages and disadvantages, types, and basic components of fabricated foods, particularly new protein foods. He discusses the uses of these materials in the major fields of meat analogs and imitation dairy products and attempts to project future developments based on the current state of the art and the technologists' ability to merge nutritional needs with preventive and therapeutic medical knowledge.
[6 tables, 102 references] LB

0.4 FREE RADICAL PATHOLOGY

Pryor, William A. (Louisiana State University, Baton Rouge, La.)
Chemical and Engineering News 49, No. 23, 34-36, 41-51 (June 7, 1971)

The author discusses various systems in which radicals play a role in the biochemical process.
[10 references for additional reading] FTP

0.6 TREATING MEAT AND FISH TO CONFER AN AGREEABLE AROMA (3.336)

Roger, Alan Barde, and Donald V. Schwall; Armour and Co. (pat.)
French Demande (patent) 2,016,221
Chemical Abstracts 74, No. 17, 86584f (April 26, 1971)

0.38 ALGINASES OF MARINE INVERTEBRATES

Favorov, V. V., and V. E. Vaskovsky (Institute of Biologically Active Substances, Vladivostok-22, U.S.S.R.)
Comparative Biochemistry and Physiology 38, No. 4B, 689-696 (April 15, 1971)

Forty species of marine invertebrates from various phyla were examined for alginase activity in their digestive system. Alginases were found in the digestive system of certain Echinoderinata, Bivalvia, and Gastropoda. The greatest activity was found in the hepatopancreas of Mollusca of genera Littorina and Collisella and in the crystalline style of Mactra sulcataria and Spisula sachalinensis. In the winter, the alginase activity disappears in the hepatopancreas of all the animals examined, but it remains in the crystalline style of bivalve Mollusca.
[2 figures, 2 tables, 16 references] FTP

0.38 RIBONUCLEIC ACID SYNTHESIS BY SALMON [RAINBOW TROUT] LIVER NUCLEI (1.37)

Tarr, Hugh L. A., and Linda Gardner (Vancouver Lab., Fish. Res. Board Canada, Vancouver, British Columbia)
Chemical Abstracts 74, No. 9, 38269k (March 1, 1971)

0.4 THE FORMATION OF NITROSAMINES BY HUMAN INTESTINAL BACTERIA (0.5)

Hawksworth, Gabrielle, and M. J. Hill (Department of Bacteriology, St. Mary's Hospital Medical School, London W.2, U.K.)
Biochemical Journal 122, No. 1, 28P-29P (March 1971)

Nitrosamines are a group of potent carcinogens that produce tumors in various sites in laboratory animals. They are formed by the action of nitrite on secondary amines under acid conditions. J. Sander [Hoppe-Seyler's Z. Physiol. Chem. 349, 429 (1968)] showed that four strains of nitrate-reducing enterobacteria could produce nitrosamines enzymically from nitrate and secondary amines at neutral pH. The present authors found the same result with a number of strains of Escherichia coli isolated from the human intestinal tract and also demonstrated that some non-nitrate-reducing strains of lactobacilli, group D streptococci, clostridia, bacteroides, and bifidobacteria will nitrosate secondary amines with nitrite at neutral pH.

Dimethylamine, pyrrolidine, and piperidine (secondary amines present in normal human urine) are nitrosated. The amount of nitrosamine formed depends upon the basicity of the secondary amine and ranged from 68% for diphenylamine to 0.01% for dimethylamine.

The authors suggest that there are two sites of the body where bacteria might produce nitrosamines: (1) in the gut from ingested nitrate and amines produced from lecithin or proline, or (2) in the urine of people with urinary-tract infections (90% of such infections are due to E. coli, the nitrosating organism). In areas where the drinking water has a high nitrate content the human urinary nitrate concentration is higher and approaches that concentration necessary for the production of nitrosamines in vitro.
[4 references] FTP

0.7 PROTEIN AND CALORIE REQUIREMENTS

Nicol, B. M. (Nutrition Division, Food and Agriculture Organization of the United Nations, Via delle Terme di Caracalla, Rome, Italy) [Reprints are available from the author.]
Nutrition Reviews 29, No. 4, 83-88 (April 1971)

The object of this article is to consider some examples of diets eaten in different ecological zones in developing countries and their "bulk" or volume in relation to the need for supplementation with protein-rich foods, protein concentrates or amino acids.

...if the older age groups in most of the developing areas have enough of their traditional food available to them they can consume it and satisfy their energy and protein requirements. However, because of the method of food preparation and the spacing of meals, the younger post-weaning children will have trouble, in any ecological zone, in "stomaching" enough of the local diet to meet their calorie and protein needs, particularly in areas where starchy roots and tubers are their staple foods. The provision of dietary supplements for young children in the form of protein-rich foods, protein concentrates, or synthetic amino acids, even if carefully tailored to meet the widely varying situations which occur in practice, will be very difficult to achieve.

Therefore it would seem best, if one is thinking in terms of preventing juvenile malnutrition in developing areas, to develop fully formulated foods, preferably from locally available foodstuffs. They could well contain protein concentrates, such as dried skimmed milk or FPC, or suitable mixtures of vegetable protein concentrates. They could contain synthetic amino acids to improve the

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1.4 (9.125) EDAD Y CRECIMIENTO DEL ARIACÓ, LUTJANUS SYNAGRIS (LINNAEUS), EN EL NORDESTE DEL BRASIL
[AGE AND GROWTH OF LANE SNAPPER, LUTJANUS SYNAGRIS (LINNAEUS), IN NORTHEAST BRAZIL]

Alegría C., José Rafael, and Mariana Ferreira de Menezes (Laboratório de Ciências do Mar, Universidade Federal do Ceará, Fortaleza, Ceará, Brazil)
Arquivos de Ciências do Mar 10, No. 1, 65-68 (June 1970) (In Spanish; English summary)

Lane snapper is one of the most important commercial fishes of Northeast Brazil. It is found as far north as Bermuda and North Carolina and as far south as Santos, Brazil (about 24° S. lat.). The present work, intended as a contribution to the biological knowledge of this fish, is based primarily on an analysis of the fish's rate of growth, growth curve, and age as reflected by its otoliths, for the relation between the growth of the fish and that of the otolith is direct. The average rate of growth between the first and sixth years of age is 51 mm. a year. The growth curve for both sexes can be represented by the formula

$L_t = 505\ [1 - e^{-0.23\ (t + 0.19)}]$, where L_t is the total length in millimeters for a given age t.
[5 figures, 2 tables, 3 references] LB

0.8 (3.17) SEA-FISHERY AND ICE MANUFACTURE FOR THE SUPPLY OF FISHERY TRANSPORT VEHICLES AND ICING OF LANDED FISH
(EISERZEUGUNG FÜR DIE SEEFISCHEREI ZUR VERSORGUNG DER FISCHEREIFAHRZEUGE UND ZUR BEEISUNG DER ANLANDUNGEN)

Flechtenmacher, W.
Kälte 23, No. 4, 147-150, 152-155 (April 1970)
Bulletin of the International Institute of Refrigeration 51, No. 9, 380 (Item 71-0461) (1971)

The requirements of fish and fish processing has led to the manufacture of several kinds of ice, distinguishable by their storage life, their refrigerating capacity, and their thawing rate. The various ice-manufacturing units are discussed in terms of their capacity, the space they require, and the function of the ice they produce. On economic grounds, the author recommends the manufacture of small pieces rather than the crushing of large pieces.
[1 figure, 1 table, 28 references] LB

1.70 (1.017)(2.1) [AUSTRALIAN SHARK FISHERY]

Pownall, P. C., et al.
Australian Fisheries 30, No. 3, 1-11 (March 1971)

The development and operation of the Australian shark fishery is featured in this issue of the journal.

"Sharks Important to Fishing Industry," by P. C. Pownall (Editor, Australian Fisheries), p. 1. Of the 80 or more species of shark that frequent Australian waters, two are the mainstay of one of Australia's most important fisheries--the gummy shark and the school shark. Originally caught for their livers, these two sharks are now the main source of supply for the fish-and-chips industry. The main fishing areas are off the coast of the three southeastern States and Tasmania, where the annual catch is about 17,000,000 lb., worth more than $2,000,000 to the fishermen.

"Edible Sharks," anonymous, p. 2. This brief article describes the physical appearance, breeding habits, and habitat of the school, or snapper, shark (Galeorhinus australis) and the gummy shark (Mustelus antarcticus). [2 photographs]

"Australian Shark Fishery: Methods and Gear," by W. D. Hughes (Fisheries Division, Department of Primary Industry, Canberra, A.C.T. 2600), pp. 3-11. Shark is one of the highest valued fish on Victorian and South Australian markets; prices range from 20 to 50¢ a pound; more than 200 boats are licensed to fish for them in the southeastern states. The five species landed (gummy, school, dog, saw, and whiskery) are caught either by longline or gill net. This article describes in detail the materials, various components and their method of being attached,

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1.70 (1.017)(2.1)

operation, and associated deck equipment for each type of gear. The widespread use of the rear axle assembly from an old car or light truck for the longline hauler and the gear box from a secondhand car or light truck as part of the mechanical or hydraulic drives that operate the reels used to haul the gill nets is noted. The article ends on a note of caution--the need to haul nets frequently (every 5 or 6 hours) and to bleed and wash shark flesh as soon as the fish are brought on board so that good quality shark can be marketed, to the benefit of the whole industry. [17 figures] LB

1.80
(1.013) QUARTA CONTRIBUIÇÃO AO INVENTÁRIO DOS CRUSTÁCEOS DECÁPODOS MARINHOS DO NORDESTE BRASILEIRO
[FOURTH CONTRIBUTION TO THE INVENTORY OF THE MARINE DECAPOD CRUSTACEANS FROM NORTHEAST BRAZIL]

Fausto-Filho, José (Laboratório de Ciencias do Mar, Universidade Federal do Ceará, Fortaleza, Ceará, Brasil)
Arquivos de Ciências do Mar 10, No. 1, 55-60 (June 1970) (In Portuguese; English summary)

The author studied 20 species of crustacea inhabiting the area bounded roughly by the northeast coast of Brazil (from the mouth of the Parnaíba to the mouth of the São Francisco) eastward to 30°W.long. and by the Equator south to about 10° S. lat. Each species is listed by catalogue number, place and date of capture, common name, and general characteristics. Families included are Palaemonidae, Alpheidae, Hippolytidae, Nephropidae, Stenopodidae, Palinuridae, Callianassidae, Porcellanidae, Paguridae, Majidae, and Parthenopidae.
[50 references] LB

0.8 AUTOMATIC DE-ICING
(3.231)

Ranco Inc., 601 West Fifth Ave., Columbus, Ohio, U.S.A. (pat.)
British Patent 1,219,732
Refrigeration and Air Conditioning 74, No. 878, 89 (May 1971)

The automatic de-icing device is actuated when the flow of air through the chilling unit drops below a certain pressure (as ice accumulates in the chilling unit, air circulation is reduced). F&P

0.7
quality of local protein resources, of which DL-methionine (or hydroxyanalogue) is probably an important one. They should be properly balanced in respect of protein and calories, which will probably require some concentrated form of energy such as oil or sugar to reduce volume, and contain vitamin-mineral mix.
Reprinted

1.11
(2.147) RELATION BETWEEN THE CATCH AND THE SEA CONDITIONS AT MACKEREL ANGLING GROUNDS

Yamada, Tetsuo
Bulletin of the Faculty of Fisheries Nagasaki University, No. 30, 39-46 (December 1970) (Nagasaki University, 1-14 Bunkyo-machi, Nagasaki, Japan) (In Japanese; figures, table, and summary in English)

Mackerel apparently shoal along the current rip formed between the coastal water and the Kuroshio warm water. As the water temperature changes, so does the behavior of the mackerel. When fish lamps were used, the fish would sometimes school in the surface layer of water; often they would go deeper. While in the surface layer, they would sometimes take the bait voraciously and sometimes show no interest at all. The author promises to clarify these phenomena in the future.
[2 figures, 1 table, 1 reference] LB

1.4
(9.12) ESTUDO SÔBRE A BIOLOGIA DA PESCA DO PARGO, LUTJANUS PURPUREUS POEY, NO NORDESTE BRASILEIRO - DADO DE 1969
[STUDY OF THE FISHERY BIOLOGY OF THE CARIBBEAN RED SNAPPER, LUTJANUS PURPUREUS POEY, IN NORTHEAST BRAZIL - DATA FROM 1969]

Fonteles-Filho, Antônio Adauto (Laboratório de Ciências do Mar, Universidade Federal do Ceará, Fortaleza, Ceará, Brasil)
Arquivos de Ciências do Mar 10, No. 1, 73-78 (June 1970) (In Portuguese; English summary)

The Caribbean red snapper is one of the principal fishery resources of Northeast Brazil, it being used as much for internal consumption as for export in the form of raw frozen fillets. In this paper, the author examines the seasonal fluctuations of the red snapper population--its length composition, sex ratio, spawning, spawning seasons, and relative abundance--throughout the year 1969.

Snappers reached by fishing action ranged from III to XVIII years of age and had lengths of from 32 to 82 cm.; however, fishing action was predominant on fish ranging from V to VIII years of age and having lengths of from 41.6 to 59.0 cm. Sometimes two modal age groups were reached simultaneously; sometimes only one. Assuming that recruitment into the fishery extends from the time that the fish are from III to V years of age, the author concluded that, although it occurred throughout the year, it was more intensive in the first and fourth quarters. He also concluded that the spawning season runs from December to April. The annual index of relative abundance (6.3 kilos caught per hook per day) was lower than the index for each of the two preceding years. The monthly indexes were highest in January, May, July, October, November, and December.
[1 figure, 4 tables, 3 references] LB

0.8 COOLING WATER RECIRCULATION
(9.19)(0.12)

Hill, C. B.
Pollution in the Seventies. Supp. Maint. Engng Industr. Process Heat., pp. 50-51 (November 1970)
BFMIRA Abstracts 24, No. 4, Abstract No. 1122, 243 (April 1971)

Factors influencing the choice of method of water recirculation and the equipment available are described. C.C.N.
Reprinted

1.81 (1.0116) A SURVEY OF THE OYSTER AND OYSTER SHELL RESOURCES OF ALABAMA

May, Edwin B. (Alabama Department of Conservation, Seafoods Division, Alabama Marine Resources Laboratory, Dauphin Island, Ala. 36528)
Alabama Marine Resources Bulletin, Number 4, 53 pp. (February 1971) (Alabama Department of Conservation, Seafoods Division, Alabama Marine Resources Laboratory, Dauphin Island, Ala. 36528)

The public oyster reefs and buried shell deposits in Alabama were mapped and inventoried. Second order survey was used to establish triangulation stations used for mapping. There are 3,064 acres of natural oyster reefs in Alabama. The average oyster harvest from 1948 through 1968 was 1,220,000 pounds valued at $415,000. An average of 655 hand-tong fishermen earned $638 per year from 1948 through 1968. The fishery is valued at $1,660,000 annually which is about 4 times the dockside value. Average annual production is 398 pounds of meats per acre with a present value to the fisherman of $200 per acre. If the economics of the fishery is considered, each acre contributes $542 yearly to the area economy. Pollution closure of oyster reefs results in an average loss to the fishermen of $1,671 per day. About 2,000 acres of private oyster bottoms produce 12 percent of Alabama's landings and are valued at $147 per acre per year. SCUBA and random yd^2 quadrats were used to sample oyster reefs. The distribution of sampled components was found to be homogeneous. Oyster density on all reefs was low. Environmental and socioeconomical factors which influence oyster production are discussed.

Shell dredging in Alabama began in 1946. A total of 40,338,220 yd^3 valued at $43,353,009 was dredged from 1947 through 1968. Average annual production

1.87 (1.013) NOTAS SÔBRE A FAMÍLIA PALINURIDAE NO NORDESTE BRASILEIRO (CRUSTACEA, DECAPODA, MACRURA) [NOTES ON THE PALINURIDAE OF NORTHEAST BRAZIL (CRUSTACEA, DECAPODA, MACRURA)]

Fausto-Filho, José (Laboratório de Ciências do Mar, Universidade Federal do Ceará, Fortaleza, Ceará, Brasil), and Ayrton Fernandes da Costa (Divisão de Recursos Pesqueiros, Superintendência do Desenvolvimento do Nordeste, Recife, Pernambuco, Brasil)
Arquivos de Ciências do Mar 9, No. 2, 103-110 (December 1969) (In Portuguese; English summary)

The physical characteristics, relative abundance, and distribution of four species of spiny lobster (Palinurellus gundlachi, Panulirus laevicauda, P. argus, and P. echinatus) along the continental and insular shelf of Northeast Brazil are described. [11 figures, 20 references] LB

1.87 (1.013)(9.2) DADOS SÔBRE A FROTA LAGOSTEIRA DO CEARÁ, NOS ANOS DE 1966 A 1968 [DATA ON THE CEARÁN SPINY LOBSTER FLEET, 1966-1968]

Costa, Raimundo Saraiva da (Laboratório Ciências do Mar, Universidade Federal do Ceará, Fortaleza, Ceara, Brasil)
Arquivos de Ciências do Mar 9, No. 2, 119-126 (December 1969) (In Portuguese; English summary)

Beginning in 1967, the export of frozen lobster tails from the fishery located along the coast of Ceará (Brazil) increased appreciably. In this survey of that commercially important fishery, the author examines the three types of boats used to catch the lobsters, the areas fished and the relative abundance of lobsters in each area (as reflected by the catch per trap per day), the catch per trip and per trap per day by each type of craft, the fishing techniques used, and the total production as a function of fishing effort.
[2 figures, 4 tables, 4 references] LB

1.87 (1.013)(9.12) ESTUDOS DE BIOLOGIA DA PESCA DE LAGOSTAS NO CEARÁ - DADOS DE 1968 [STUDIES OF THE BIOLOGY OF THE SPINY-LOBSTER FISHERY IN CEARÁ, DATA FOR 1968]

Paiva, Melquíades Pinto, and Raimundo Saraiva da Costa (Laboratório de Ciências do Mar, Universidade Federal do Ceará, Fortaleza, Ceará, Brasil)
Arquivos de Ciências do Mar 9, No. 2, 133-146 (December 1969) (In Portuguese; English summary)

In 1968, Brazilian exports of frozen lobster tails totaled 1,683 tons. Of this amount, 1,416 tons, or 84%, was shipped from Fortaleza. Thus the Marine Sciences Laboratory of the Federal University of Ceará began a series of studies on the biology and the economics of this commercially important fishery by examining the composition of the lobsters landed on the beach of Mucuripe. This paper is the first report of the series. It is concerned almost exclusively with the relative abundance, by season, of males and females of only two species--Panulirus argus (Latr.) and P. laevicauda (Latr.)
[5 figures, 7 tables, 7 references] LB

1.87 (9.3)(7.9)

ESCALA DE COLORES PARA EL ESTUDIO DEL CICLO REPRODUCTOR DE LA LANGOSTA PANULIRUS ARGUS (LATR.) EN EL ÁREA DEL MAR CARIBE [COLOR SCALE FOR DETERMINATION OF THE REPRODUCTIVE CYCLE OF THE SPINY LOBSTER PANULIRUS ARGUS (LATR.) IN THE CARIBBEAN AREA]

Buesa Más, René J. (Centro de Investigaciones Pesqueras, Instituto Nacional de la Pesca, Playa Habana, Bauta, Cuba), and Maria Ivone Mota Alves (Laboratório de Ciências do Mar, Universidade Federal do Ceará, Fortaleza, Ceará, Brasil)
Arquivos de Ciências do Mar 10, No. 1, 107-109 (June 1970) (In Spanish; English summary)

In 1965, according to an FAO report, 17,400 tons of spiny lobster was caught in the geographic area between Bermuda and Brazil. This figure represented 31.6% of the world total of captured Palinuridae and 18.9% of the total of lobsters of all types. The economic importance of this fishery has motivated its regulation, which is based on periods of legal interdiction, minimum size of recruitment into the fishery, and prohibition of the capture of females with eggs. The authors recommend use of a color scale for determining the reproductive cycle of the species and, thus, the probable periods of larval dispersion. These determinations can be amalgamated with the theory reported by Ingle et al. (1963) relative to the possible Caribbean origin of Florida's spiny lobster populations.
[4 tables, 20 references]

LB

1.87 (1.013)(9.2)

ESTUDO SÔBRE A PESCA DE LAGOSTAS NO CEARÁ, DURANTE O ANO DE 1969 [STUDY OF THE SPINY LOBSTER FISHERY IN CEARÁ FOR 1969]

Paiva, Melquíades Pinto (Laboratório de Ciências do Mar, Universidade Federal do Ceará, Fortaleza, Ceará, Brasil)
Arquivos de Ciências do Mar 10, No. 1, 91-103 (June 1970) (In Portuguese; English summary)

The export of frozen lobster tails from Brazil began in 1955. From that year until 1969, total exports reached 17,329 metric tons. Most of the lobster fishery in Brazil is confined to the northeast region. In 1969, the peak export year for frozen lobster tails, 1,916 metric tons was exported from Fortaleza; this represented 77.5% of the total lobster exported from Brazil. In this paper, the author reports his findings from a study of the Panulirus argus (Latreille) and Panulirus laevicauda (Latreille) fishery in Ceará. These lobsters are the only two commercial species of lobster exported from Northeastern Brazil.

In 1969, Ceará, produced 2,088,911.5 kilos of fresh lobster tails; this represented 15,297,902 lobsters caught. The mean weight of the tails was 133 g. The annual mean relative density of the catch was 1.3 lobsters/trap/day; total fishing effort was about 11.5 million traps a day. The high production figure is attributable to the appreciable increase in fishing effort, despite the lower trap efficiency, which resulted in a low annual relative density index.

Because spiny lobster production in Ceará is so clearly related to the fishing effort employed, and because operational costs continuously increase as a result of decreasing trap efficiency, there is increasing economic disorder in the Cearán spiny lobster fishery.
[5 figures, 20 tables, 9 references]

LB

1.81 (1.0116)

during that period was 1,833,555 yd^3 and the average royalty was $188,726 per year. Total royalty paid the State was $4,151,966. The total volume of buried shell in Alabama is 93,612,588 yd^3. Of this total, 34,451,071 yd^3 are under or within 300 feet of oyster reefs. An additional 12,942,006 yd^3 cannot presently be dredged economically because the overburden is excessive or the deposit is too thin. The remaining inventory of buried shell as of January 1970 was 46,219,511 yd^3 valued at $67,018,291. The shell industry has an average annual sales of over $2,000,000 and annually contributes about $5,000,000 to the area economy.
[12 figures, 13 tables, an appendix with 26 tables, 52 references]

Author's abstract

[11 figures, 3 tables, 8 references] LB

The author briefly describes the Cornish crawfish fishery (an important part of the local fishing economy), including recent changes in gear and fishing methods; compares the landings of crawfish and of lobster since 1920; analyzes the catch per unit of effort; and considers the character and sustainability of the crawfish population. Although the abundance of crawfish has been reduced in recent years, with the consequent decrease in catch per unit of effort, he does not consider the reduction dangerous to the stock as a whole.

1.0146 CORNISH CRAWFISH INVESTIGATIONS (1.89)

Hepper, B. T. (Fisheries Experiment Station, Conway, Caernarvonshire, United Kingdom)
Laboratory Leaflet [Fisheries Experiment Station, Conway] (new series) No. 22, 20 pp. (March 1971)

1.80 (1.013)

MOLUSCOS MARINHOS DO NORTE E NORDESTE DO BRASIL. II - MOLUSCOS DO ARQUIPÉLAGO DE FERNANDO DE NORONHA (COM ALGUMAS REFERÊNCIAS AO ATOL DAS ROCAS) [MARINE MOLLUSKS FROM NORTH AND NORTHEAST BRAZIL. II - MOLLUSKS FROM THE ARCHIPELAGO OF FERNANDO DE NORONHA (WITH SOME REFERENCES TO THE ATOLL OF ROCAS)]

Matthews, Henry Ramos (Laboratório de Ciências do Mar, Universidade Federal do Ceará, Fortaleza, Ceará, Brasil), and Marc Kempf (Laboratório de Ciências do Mar, Universidade Federal de Pernambuco, Recife, Pernambuco, Brasil)
Arquivos de Ciências do Mar 10, No. 1, 1-53 (June 1970) (In Portuguese; English summary)

Rocas Atoll lies some 110 miles northeast of Cape São Roque (Rio Grande de Norte, Brazil); the Archipelago of Fernando de Noronha lies about 85 miles due east of Rocas; both are in the north branch of the South Equatorial Current. In this second part of their study of the mollusks inhabiting the littoral and the Continental Shelf in this area, the authors compile a vast amount of biological and ecological data obtained by diving and dredging; their added information on the geographical distribution of each species is based on consulted literature. They report 168 molluscan species inhabiting the Archipelago of Fernando de Noronha and 77 inhabiting the Atoll of Rocas; 22 of the latter were not found in the Archipelago. Most of the species recorded have also been reported off the southeastern coast of the United States.

[Part I of this study, entitled "Preliminary List," appeared in Arq. Est. Biol. Mar. 8, No. 1, 87-94 (1968), Univ. Fed. Ceará, Fortaleza]
[1 figure, 4 tables, 166 references]

LB

1.9 (9.17) PRODUCŢIA ŞI REZERVELE DE STURIONI DE PE GLOB
[PRODUCTION AND STOCKS OF STURGEON THROUGHOUT THE WORLD]

Manea, Gheorghe
Buletinul de Cercetări Piscicole 29, No. 4, 52-65 (October-December 1970) (Institutul de Cercetări şi Proiectări Piscicole, Ministerul Industriel Alimentare, B-dul Ana Ipătescu Nr. 46, Bucureşti 22, Republica Socialistă România) (In Rumanian; English, French, and Russian summaries)

The author tabulates the catch of sturgeon, by political and hydrographic area (including those of the United States) over the past several decades. He notes that intense and irrational catches, hydrological and hydrobiological conditions created in dammed rivers, and destruction of fry by use of trap and gill nets have diminished the stocks two- or threefold over the last century in the Azov Sea, the Black Sea, the Siberian river basins, and the Mississippi River basin, to name a few. Therefore, he suggests, the following measures should be taken to restore and preserve the stocks: (1) protect and improve natural breeding zones and protect the fry; (2) interdict, limit, and rationally organize catching, the particulars to be governed by the basin, the zone, and the season; (3) annually stock, by plan, rivers that have been dammed for hydroelectric purposes with fry reared in special ponds.
[8 tables, 25 references] LB

2.00 (1.7) SPOILAGE OF SHARK

James, D. G., and June Olley (CSIRO Division of Food Research, Hobart, Tasmania)
Australian Fisheries 30, No. 4, 11-13 (April 1971)

The concentration of urea, precursor of the ammonia formed in shark after death, ranges from 1 to 2.5% (by weight) in sharks. Many investigators have attempted without success to find urease, which breaks urea down to ammonia, in shark muscle. It stands to reason then that, since many bacteria produce this enzyme, the production of ammonia can be linked to bacterial contamination. And such production can continue till the flesh contains as much as 1,000 mg. of ammonia nitrogen per 100 g. (Tanikawa determined, in 1938, that the limit of edibility is 30 mg. of volatile base nitrogen, of which ammonia is nearly all, per 100 g. of flesh.)

Using the data on uniced shark reported in three Japanese papers and one Canadian paper and those in an unpublished Australian work, the authors estimated the time required for shark flesh to spoil (at which time it will contain 30 mg. of ammonia nitrogen per 100 g. of flesh) and to putrify (at which time it will contain 100 mg. of ammonia nitrogen per 100 g. of flesh). They then plotted the logarithm of the reciprocal of the spoilage (or putrification) time against the reciprocal of the absolute temperature for both spoilage levels, absolute temperature being actual temperature plus 273° C. In both plots, all the data points between 1° and 35° C. fell on or very close to a straight line, showing that the species of shark and the area of capture have little effect on the production of ammonia. Using values picked from the straight line in the spoilage plot, the

(over)

2.116 (9.11)(2.12) ELECTRONIC AIDS TO NAVIGATION

Marriott, John (Public Relations Office, Society for Underwater Technology)
Underwater Journal and Information Bulletin 3, No. 1, 6-12 (February 1971)

Navigation is just as important--and often more so--to the oceanologist as to the mariner. This article describes some of today's modern electronic aids to navigation. Since radio is the main electronic aid, the two broad types of radio aids (one relying on transmissions from shore and normally working on the hyperbolic principle and the other on transmissions from satellites) are described in detail, with the numerous different ways of carrying out the same function within these two broad types being given attention. Two modern ways of plotting position by dead reckoning--necessary when the navigator needs to estimate his position between fixes--are also discussed.
[7 figures, 6 references] LB

2.1114 (9.6) ENCYCLOPEDIA OF KNOTS AND FANCY ROPE WORK

Graumont, Raoul, and John Hensel
International Marine Publishing Company, 706 pp. (n.d.) $12.95
National Fisherman 51, No. 2, 45 (June 1970)

This book covers 3,668 knots. It discusses splicing, coxcombing, braiding, catting, fringing, and needlework and includes a chapter on splicing wire rope. Also included are a glossary and an index. [illustrated] LB

2.117 (2.1473)(2.1474) OPEN-HOLD ROCK LOBSTER CATCHER SAILS TO TRISTAN

Anonymous
South African Shipping News and Fishing Industry Review 26, No. 2, 60-61, 63 (February 1971)

The 123-ft. Hillary is a rock-lobster catcher built for long-lining. The line averages 1,100 fathoms in length; it can be laid to a depth of 150 fathoms. The first trap is 10 fathoms from the block; successive traps are attached at 7-fathom intervals; thus between 50 and 75 traps can be laid on each line. The line is hauled by a hydraulic Barton winch having a capacity of 3 tons at 120 feet per minute. Two other like winches and two derricks having a capacity of 3 tons make up the lifting gear.

Once the lobsters are brought on board, they are placed in 10 steel-rod crates (5 ft. × 5 ft. × 10 ft.) that fit neatly into the Hillary's hold. There eight 12-in. holes in the hull, on or below the water line, admit running sea water in a quantity adequate to keep the lobsters alive and in prime condition for processing. Since hoisting the filled crates across rough seas to the processor-freezer ship proved unacceptably dangerous, collapsible vinyl bags fitted with flotation collars were devised. A bag is fitted to one of the hatches of the 10-hatch hold; a cage is lifted up over the bag; and a gate at the bottom of the cage is opened, releasing the lobsters into the bag. Thus all the work is done inboard; only when the catch is securely confined within the bag is it transferred to the processor-freezer.

Other features and equipment of the Hillary are also described.
[7 photographs] LB

2.00 (1.7)

authors drew a simplified curve showing the relation between temperature and time for shark fiseh to spoil. In summary, these values are as shown in the table. The margin of safety between wharf and retailer, they warn the fisherman, will depend on how much of the total time-to-spoil he uses up.

Temperature	Spoilage time of shark
°F.	hr.
32	240
41	144
50	84
59	48
66	30
77	18
86	12

Discoloration in shark flesh is probably caused by blood pigments or blood splashes. Since blood usually has a higher urea content than muscle has, ammonia production can be reduced by bleeding the shark while it is still thrashing about (after death, blood clots and is hard to remove).

Since the introduction of mesh nets into the Australian shark fishery, the quality of landed fish has declined. Buyers at the Melbourne fish market have made numerous complaints, and some Tasmanian processors refuse to buy mesh-netted shark. Sharks caught in nets usually exhaust themselves and die by smothering. Since bacterial attack begins rapidly in exhausted fish, spoilage in sharks held dead in the net for considerable periods is likely to be well advanced by the time the fish are hauled on board. In contrast, sharks caught on longlines are usually alive and struggling when they are brought on board. One of the 1971-72 projects of CSIRO is determination of the difference in spoilage rates between sharks caught in mesh nets and those caught by longline. Attempts will be made to work out accurate time-temperature tolerances based on setting times.

[3 figures, 1 table, 15 references] LB

2.01 (1.013)(1.4)

CONTAMINAÇÃO BACTERIOLÓGICA DE PEIXES DO GÊNERO LUTJANUS BLOCH, NO NORDESTE DO BRASIL [BACTERIOLOGICAL CONTAMINATION OF FISHES OF THE GENUS LUTJANUS BLOCH IN NORTHEAST BRAZIL]

Caland-Noronha, Maria da Conceição, and Roberto Cláudio F. Bezerra (Laboratório de Ciências do Mar, Universidade Federal do Ceará, Fortaleza, Ceará, Brasil) Arquivos de Ciências do Mar 9, No. 2, 115-118 (December 1969) (In Portuguese; English summary)

The bacteriological aspects of the muscle and the contents of the digestive tract of two species of snapper (Lutianus purpureus Poey and L. vivanus (Cuvier & Valenciennes)) caught along the northeast coast of Brazil were examined. The number of aerobic bacteria and of coliforms in the muscle increased exponentially with the time of storage on board. Flavobacterium Bergey et al., Escherichia Castellani and Chalmers, and Aerobacter Beijerinck predominated in the contents of the digestive tract. Proteolytic and other species found in the muscles were attributed to the poor hygienic conditions prevailing on board.

[1 figure, 4 tables, 3 references] LB

2.119 (9.6)

SAFETY ON FISHING VESSELS

Anonymous
The Motor Ship 52, No. 609, 38 (April 1971)

The illustrated booklet "Safety on Fishing Vessels" describes safety procedures for handling gear during trawling, purse seining, and longline fishing, and includes information on servicing of machinery. The booklet was prepared from the Recommended Code of Safety of Fishermen on Trawlers prepared by a working group of representatives of industry and government. The recommendations are aimed primarily for vessels over 80 feet long but include safety procedures applicable to smaller vessels. The booklet may be obtained from the Marine Library, Room G/7, 90-93 High Holborn, London W.C.1, England. FTP

2.3

INSTALLATION, FOR POSITIONING AND CONVEYING FISHES BEFORE HEAD-CUTTING (VORRICHTUNG ZUM LAGEEINSTELLEN UND ZUFÜHREN VON FISCHEN ZUM KÖPFEN)

Hartmann, F. (Nordischer Maschinenbau Rudolf Baader)
West German Patent Application 1,292,819 (1969) (In German)
Food Science and Technology Abstracts 3, No. 3, 3R100, 500 (March 1971)

2.116 (2.12)

ACOUSTIC GEAR BROADENS RANGE OF FISHERIES RESEARCH

Anonymous
UnderSea Technology 12, No. 3, 19 (March 1971)

The key role of the 170-ft. G. O. Sars, owned and operated by the Institute of Marine Research, Bergen, Norway, is to give practical assistance to fishing fleets. On board is a hydroacoustic room containing four echo-sounders, two specially constructed sonars, and special peripheral instruments for fish counting, plankton and fish measurement, echo playback, and special recording and presentation of different types of echo. The long-range sonar hull units are installed on stabilizing platforms that protect against roll and pitch to an accuracy of ±2°. Other installations and equipment are also described.
[2 photographs] LB

2.03

INFLUENCE OF TEMPERATURE CHANGES ON ENZYMES OF FISH MUSCLES. EXPERIMENTS WITH GOLDEN ORFS IDUS IDUS

Kuennemann, H., H. Lauglen, and H. Precht (Zool. Inst., Univ. Kiel, Kiel, Germany)
Chemical Abstracts 74, No. 9, 39819j (March 1, 1971)

2.12 (1.0117) (1.9) EXPLORATORY FISHING FOR SOUTHERN SEA BASS, CENTROPRISTES STRIATUS MELANUS, IN THE NORTHEASTERN GULF OF MEXICO

Godcharles, Mark F. (Marine Research Laboratory, Florida Department of Natural Resources, Division of Marine Resources, St. Petersburg, Fla.)
State of Florida Department of Natural Resources Technical Series No. 63, 26 pp. (December 1970)

In 1968, the Florida Marine Research Laboratory conducted an extensive trapping program to assess the commercial potential of sea bass, a fish exploited minimally in the Gulf area. Three types of trap, set 540 times in all, caught 2,283 sea bass. The Caribbean heart traps caught larger fish in greater quantities and retained them better than did the Cedar Key stone-crab traps or the blue-crab traps. Waters deeper than 40 ft. in the area between Carrabelle and the mouth of the Suwannee were most productive. From 20 to 40% of the bass caught were of marketable size (longer than 200 mm.); upon being filleted and boned, they yielded an average of 33% by weight of marketable product.

The author notes that most sea bass are shipped to out-of-state markets because no local markets exist. If the fishery is to attain its potential, he says, local markets must be established and more efficient processing methods developed to minimize waste. With the introduction of new commercial fish-meat-extraction equipment, use of sea bass for fillets and fish sticks may prove profitable--and significantly increase fishing pressure on the stock.

[7 figures, 4 tables, 30 references] LB

2.8 (4.4)(4.5) SCIENCE OF DEEP FAT FRYING

Berger, K. G.
Food Manufacture 46, No. 2, 63-64 (February 1971)

The author reviews briefly the reports presented at the symposium on the science of heated fats and deep fat frying. The symposium was one of several presented at the tenth Congress of the International Society for Fat Research held in Chicago, Ill., in September 1970. The American Oil Chemists' Society served as hosts for the Congress.

Stephen Chang (Rutgers University) described areas in which further knowledge is required. These areas include: effects of decomposition products of the frying oil on the texture and stability of the food product, the effects of volatile products on flavor and aroma, length of use of frying oil before it is discarded, and impartation of different flavors to the product by various oils.

B. L. Thomas described the important factors in the design of frying equipment. Some of his suggestions are: heat input of a fryer must be sufficient for maximum production capacity; direct fired bottom heating is undesirable; stainless steel is the best construction material; filtration of the oil is desirable but should be carried out without aeration; the fryers should be designed so that the hot oil surface will be blanketed with steam.

F. Padley explained how he was able to reduce the rate of deterioration of frying oils under practical conditions by adding a small amount of methyl silicone.

W. A. May (Rutgers University) discussed the isolation and identification of decomposition products formed when pure trilinolein was submitted to simulated frying conditions. R. J. Sims (General Foods), Artman (Procter and Gamble), and

2.15 (2.3) TEXAN DESIGNS UNIT TO SORT FISH, ADD TO U.S. FISH MEAL PRODUCTION

Anonymous
Feedstuffs 43, No. 3, 44 (June 5, 1971)

Using manual techniques, shrimpers can recover only about half their shrimp catch before the sun's heat causes spoilage to set in. With a newly designed, hydraulically actuated machine that separates the shrimp from the fish mechanically, they can retain all their catch. According to the inventor (Jack R. Lovett, of Orange, Tex.), Texas shrimpers alone throw more than 6,000,000 tons of fish overboard every year. If the sorting machine were coupled with a shipboard fish-meal machine, he says, these 6,000,000 tons of fish could be converted into 500,000 tons of fish meal--more than the United States imports every year from Peru. In addition, shrimpers could fish the year round rather than less than two-thirds of the year, as they presently do because of the heat factor.

[1 photograph] LB

2.9 PURIFICATION AND CHEMICAL STUDIES OF A TOXIN FROM THE VENOM OF LAPEMIS HARDWICKII (HARDWICK'S SEA SNAKE)

Tu, Anthony T., and Bor-Shyue Hong (Department of Biochemistry, Colorado State University, Fort Collins, Colo. 80521)
Journal of Biological Chemistry 246, No. 9, 2772-2779 (May 10, 1971)

Sea snake venoms contain potent neurotoxins and are more toxic than those of terrestrial snakes. Earlier articles have reported on the isolation and chemical properties of the toxins from the venom of Enhydrina schistosa (from the Strait of Malacca and along the east coast of the Malayan Peninsula) and from the venom of Laticauda semifasciata (from Gato Island, Philippines) [A. T. Tu and P. M. Toom, Journal of Biological Chemistry 246, 1012 (1971); and A. T. Tu, B. S. Hong, and T. N. Solie, Biochemistry 10, in press (1971)]. Immunological studies revealed that the venoms of the different sea snakes were not immunologically identical. The present study involved the purification and chemical characterization of the toxins of the venom of Hardwick's sea snake (the snake is commonly found in coastal waters of Sumatra, New Guinea, Queensland, Thailand, Vietnam, Hong Kong, Borneo, and the Philippines).

The lethality (to white mice) of the purified toxin was 23 times that of the original venom. The molecular weight of the toxin was about 6,800. It consists of 61 amino-acid residues and does not contain a free sulfhydryl group. There is a histidine at the NH_2-terminal and an aspartic acid or asparagine at the COOH-terminal. The isoelectric point is 9.85. When the tryptophan residue of the toxin was modified with 2-nitrophenylsulfenyl chloride, 2-hydroxy-5-nitrobenzyl-bromide, or N-bromosuccinimide, the toxicity of the purified toxin was lost.

[11 figures, 4 tables, 30 references] FTP

2.8 FOOD SEASONINGS

Yamamoto, Atsushi, Daiziku Omori, and Hiroshi Yasui (Kyowa Fermentation Industry Co., Ltd.)
Japanese Patent 70 20,942 (1970)
Chemical Abstracts 74, No. 15, 75377q (April 12, 1971)

2.6 (9.16) LIVE WEIGHT-DRESSED WEIGHT RELATIONSHIPS FOR COMMERCIAL FISHES FROM FOUR OKLAHOMA RESERVOIRS

Mensinger, Gary, and Bradford E. Brown (Oklahoma Dept. of Wildlife Conservation, Oklahoma City, Okla.)
Twenty-second Annual Meeting of the Southern Div., Amer. Fish. Soc., Baltimore, Md., October 23, 1968
Sport Fishery Abstracts 16, No. 1, Abstract No. 12845, 17 (1971)

In order to determine appropriate relationships between live and dressed weights, regression and correlation analysis were performed on these data. This paper presents the results of seasonal and lake comparisons and gives the best estimating equations for converting dressed and live weights for the flathead catfish, Pylodictis olivaris; smallmouth buffalo, Ictiobus bubalus; bigmouth buffalo, Ictiobus cyprinellus; river carpsucker, Carpiodes carpio; freshwater drum, Aplodinotus grunniens; carp, Cyprinus carpio, paddlefish, Polyodon spathula. (From authors introduction) Reprinted

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3.2342 FREEZING BY HALOGENATED HYDROCARBONS (FRIEREN MIT FREON)

Anonymous
Tiefkühl-Praxis Int. 11, No. 8, 16, 18 (August 1970)
Bulletin of the International Institute of Refrigeration 51, No. 9, 380 (Item 71-0460) (1971)

A continuously operating plant for deep-freezing foods with halogenated hydrocarbon spray is depicted schematically and its physical characteristics are summarized. As illustration, the following deep-freezing times are given: 1 min. for potato chips and meat cubes, 2 min. for strawberries, 3 min. for hake fillets, and 10 min. for poultry cuts. The process, which is allowed in the United States, preserves the quality of the food and is economical.
[2 figures] LB

2.12 FAO DISCUSSES USE OF SUBMERSIBLES FOR UNDERSEA-RESEARCH

Anonymous
Australian Fisheries 30, No. 5, 20-21 (May 1971)

The author reports on interviews held with four of the seven experts on underwater research who have been meeting at FAO headquarters in Rome to approve a draft manual on the use of submersibles as manned underwater stations or habitats where marine scientists engaged in fishery research can live and work as divers. Professor Jacques Piccard (Switzerland) pointed out that between 50 and 70% of the earth's oxygen is produced by the sea's phytoplankton; thus it is very important, not only in the long term but in the very short term as well, that we dump nothing into the sea that could endanger these phytoplankton. William High (United States) described the proven advantages of working from underwater houses without having to go through usual decompression procedures. John H. Anderson (Canada) said that men living in submersibles can gather information scuba divers and television cameras cannot provide, information that is absolutely essential to managing the fisheries--to setting international quotas, for example. Dr. Erdogan Akyuz (FAO's Fisheries Resources Division) said that FAO's prime interest in underwater research is to see how it can be used by fisheries scientists from the developing countries. FTP

2.8 (4.4)(4.5)

Billek (Unilever, Hamburg), S. Ota (Ajinomoto Co.), M. Radtke (Munich), K. G. Berger (J. Lyons), P. Swobada (F.R.I. Norwich), and C. D. Evans (U.S.D.A.) also discussed decomposition of heated oils.
F. A. Kummerow (University of Illinois), D. K. Lang (Germany), and E. G. Perkins (Illinois) discussed the nutritive value of heated oils.
[The article failed to indicate fully the name, organization, and address of each participant listed above.] FTP

2.9 FISHES IN PEST SITUATIONS

Lennon, Robert E. (U.S. Bur. of Sport Fish. and Wildl., Fish Control Lab., La Crosse, Wis.)
Vertebrate Pests: Problems and Control, Vol. 5, Chapter 2, pp. 6-41 (1970)
Published at Univ. of Calif., Davis, Calif.
Sport Fishery Abstracts 16, No. 1, Abstract No. 12876, 25 (1971)

Chapter 2 includes: Fishes that affect man's safety: Biting fishes, Electric fishes, Venomous fishes, Poisonous fishes, Fishes as hosts for human parasites; Fishes that affect man's welfare: Marine fishes, Freshwater fishes; Combating pest problems: Biological controls, Physical controls, Chemical controls, Legal controls, Methodology and mechanics; Appendix A Common and scientific names of fishes; Appendix B Formulas of fish toxicants; References.
[From contents] Reprinted

2.6 SELL MORE TROUT

Robinson, Clay M. (U.S. Trout Farmers Association)
American Fishes and U.S. Trout News 16, No. 1, 8, 10, 12, 30 (May-June 1971)

This article gives specific procedures--dozens of them--that the trout farmer may find effective for reaching the public, promoting sales, and developing business. LB

2.08 CHILLING FOOD

N.V. Philips Gloeilampenfabrieken, Eindhoven, Holland (pat.)
British Patent 1,220,905
Refrigeration and Air Conditioning 74, No. 878, 89 (May 1971)

Meat or vegetables are dipped into a liquid halogenated hydrocarbon (between -40° F. and -148° F.) to cool them. This practice reduces moisture loss in the products to be chilled. FTP

2.05 FACTORS AFFECTING THE GERMINATION OF SPORES OF CLOSTRIDIUM BOTULINUM TYPE E (0.5)

Ando, Yoshiaki, Hiroo Iida (Hokkaido Inst. Public Health, Sapporo, Japan)
Chemical Abstracts 74, No. 11, 50784g (March 15, 1971)

3.2389 (6.14) THE PROTECTION OF PACKAGED FOODS FROM INSECT ATTACK (TRIALS USING PYRETHRUM, SYNERGISED PYRETHRINS AND CARBARYL AS PAPER COATINGS)

Langbridge, D. M. (Australian Paper Manufacturers Limited, Petrie, Queensland, Australia, 4502)
Pyrethrum Post 10, No. 4, 6-9, 14 (October 1970) (The Pyrethrum Bureau, P.O. Box 420, Nakuru, Kenya)

The main methods of preventing insect infestation in packaged foods are observance of warehouse hygiene, the use of insect-proof closures, and treatment of the packaging with insect repellents or other chemicals. The only chemicals approved by the FDA for use on food packages are pyrethrins or a combination of pyrethrins and piperonyl butoxide. However, pyrethrins are readily absorbed by fibrous packaging materials; thence they may migrate into the contents of the pack. The object of this report was to determine how the activity and migration of pyrethrum may be influenced by the type of carrier film and the properties of the treated paper sheet.

The author treated various packaging papers with emulsions of pyrethrins, carbaryl (1-naphthyl-N-methylcarbamate), and piperonyl butoxide in various concentrations and used 14- to 28-day-old flour beetles (Tribolium confusum) to test the resulting surface activity and repellency. He concluded that wax-pyrethrum emulsions provide the most effective insect-resistant package. But maintenance of an active surface treatment on the package depends on the dosage rate of the pyrethrins and the ratio of synergist to pyrethrum, the migration of the active material into the pack (with resulting reduced biological activity of the active material and increased possibility of the packaged commodity's becoming tainted),

(over)

4.14 COMPOSITION OF WAX ESTERS, TRIGLYCERIDES AND DIACYL GLYCERYL ETHERS IN THE JAW AND BLUBBER FATS OF THE AMAZON RIVER DOLPHIN (INIA GEOFFRENSIS)

Ackman, R. G., and C. A. Eaton (Halifax Laboratory, Fisheries Research Board of Canada, Halifax, Nova Scotia), Carter Litchfield (Department of Biochemistry, Nelson Biological Laboratories, Rutgers University, New Brunswick, N.J. 08903)
Lipids 6, No. 2, 69-77 (February 1971)

This work is a part of a study of the properties of and the involvement of lipids in Cetacean sound organs. The lipid compositions of the dorsal blubber and of the lower jaw fat (a possible ultrasonic sound receptor) of the fresh-water dolphin Inia geoffrensis were determined.

The lower jaw fat contained 52.8% wax ester, 44.7% triglyceride, and 2.5% diacyl glyceryl ether; the blubber fat was > 98% triglyceride. The blubber triglycerides showed characteristics of the fats of fresh-water fish, but the jaw fat lipids had several distinctive features. The jaw fat wax esters, triglycerides, and diacyl glyceryl ethers were rich in C_{10}, C_{12}, and C_{14} fatty acids and contained no polyunsaturated acids. The fatty alcohols in the wax esters were greater than 90% saturated. The major carbon numbers in the jaw fat triglycerides were C_{38}-C_{46}; those in the blubber triglycerides were C_{48}-C_{54}.

The authors conclude that the possible function of the 2.5% diacyl glyceryl ethers in Inia jaw fat is obscure (as it is in most tissues where this lipid is found). These ethers are probably not present in sufficient quantity to have any major effect on the acoustical properties of the fatty tissue.
[3 figures, 3 tables, 52 references] FTP

4.11 METHOD FOR GAS CHROMATOGRAPHIC ANALYSIS OF FATTY ACID COMPOSITION OF GLYCERIDES CONTAINING SHORT-CHAIN FATTY ACIDS

Fujikawa, Takuma, Morio Hamashima, and Kōsaku Yasuda (Research Laboratory, The Nisshin Oil Mills, Ltd., 1-3, Chiwaka-cho, Kanagawa-ku, Yokohama, Japan)
Journal of Japan Oil Chemists' Society 20, No. 3, 138-143 (1971) (In Japanese; figures, tables, and summary in English)

n-Propylester method was studied to establish a simple and convenient method for gas chromatographic determination of fatty acid composition of fats and oils, such as butter fat, containing both low and high molecular weight acids. The conditions of the preparation of propylesters were examined with the mixtures of butyric and capric acids. It was found that the following procedure was appropriate to prepare the propylesters for GLC analysis.

0.25 g. of acids and 1.25 g of alcoholysis reagent (0.3% sodium in n-propyl alcohol) were placed in a 100 ml volumetric flask and the mixture was gently agitated at room temperature for 5 minutes. Then the flask was filled up with 20% aqueous solution of sodium chloride to separate ester, and after vigorous shaking the mixture was allowed to stand at 40° C. Propylesters were obtained with a small amount of propyl alcohol as an upper layer.

This procedure was further applied to triglycerides containing low molecular weight acids and the results were satisfactory.
[3 figures, 9 tables, 16 references] Authors' abstract

4.5 LIPID AUTOXIDATION IN FREEZE-DRIED MEATS

Chipault, Jacques R. (University of Minnesota, The Hormel Institute, Austin, Minn. 55912), and John M. Hawkins
Journal of Agricultural and Food Chemistry 19, No. 3, 495-499 (May-June 1971)

The autoxidation of the protein and lipid fractions of freeze-dried beef and chicken was examined. The freeze-dried samples were stored in air in ovens at 40° C. or at 60° C. The following measurements were made on the stored samples: oxygen absorption, thiobarbituric acid reactive substances, peroxide value, spectral absorption (of the extracted fat), soluble reducing substances, free thiol groups, and total reducing substances.

No peroxides were found. Changes in spectral absorption of the fat, thiobarbituric acid reactive substances, and reducing capacity of the dried meats were small and could not be correlated with absorption of oxygen. Only the oxygen absorption test was useful for indicating oxidation.

The autoxidation of freeze-dried meat takes place in two stages. First, the protein-bound lipids autoxidize without an induction period; the initial rate of autoxidation decreases with time. Secondly, after a period of lower oxygen absorption, the free glyceride fat begins to autoxidize in the autocatalytic manner characteristic of autoxidation in isolated glyceride fats.
[7 figures, 1 table, 27 references] FTP

4.13 FISH CUTANEOUS MUCUS: A NEW SOURCE OF SKIN SURFACE LIPID

Lewis, R. W. (CSIRO Division of Food Preservation, P.O. Box 43, Ryde 2112, Australia)
Lipids 5, No. 11, 947-949 (November 1970)

Mucus from three species of marine fish (mullet, dusky flathead, and marine catfish) contained up to 20 times more lipid per unit area than did human sebum. Free fatty acids occur at levels of from 10 to 23% in the fish mucus lipids; they may provide protection for the fish against bacterial and fungal attack. Carotenoids were present in the mucus. Probably the phospholipid content is the major factor determining the viscosity of the mucus.
[13 references] FTP

4.5 OXIDATION AT INTERMEDIATE MOISTURE CONTENTS
(3.64)

Labuza, T. P., N. D. Heidelbaugh, M. Silver, and M. Karel (Department of Nutrition and Food Science, Massachusetts Institute of Technology, Cambridge, Mass. 02139)
Journal of the American Oil Chemists' Society 48, No. 2, 86-90 (February 1971)

Earlier work has shown that in dehydrated foods or model systems, rancidity could be slowed or prevented for long periods by increasing the moisture content (or equilibrium relative humidity of a food). The antioxidant action has been attributed to hydrogen binding of peroxides and hydration of metal catalysts. In the present study, the researchers determined, at intermediate moisture levels, the extent of lipid oxidation in model food systems and the effectiveness of various food grade antioxidants in preventing the reaction. They hoped to further clarify the mode of interaction of water in oxidizing systems. The two model systems consisted of: (1) a cellulose system: microcrystalline cellulose, methyl linoleate, glycerol, and water and (2) protein system: casein, methyl linoleate, glycerol, and water.

The rate of oxidation of methyl linoleate in the protein model system and the cellulose model system increased at intermediate moisture levels. At low moisture content, the water hydrates metals and hydrogen bonds with peroxides, resulting in a decrease in the rate of lipid oxidation. At high moisture contents (in the region with water activity of 0.6 to 0.7), the water acts as a solvent to dissolve and mobilize previously unavailable trace metals, resulting in increased rate of oxidation of the lipid. Chelating agents, such as ethylenediaminetetraacetic acid and citric acid, reduced the rate of oxidation of the lipid significantly; some antioxidant activity was shown by butylated hydroxyanisole.
[5 figures, 3 tables, 12 references] FTP

4.11 APPLICATION OF NON-AQUEOUS COULOMETRY FOR THE ANALYSIS OF OIL AND PETROLEUM PRODUCTS

Miyake, Shingo (Hiranuma Sangyo Co. Ltd., 1739 Motoyoshida-cho, Mito, Japan)
Journal of the Japan Oil Chemists' Society 20, No. 3, 125-130 (1971) (In Japanese)

3.2389 (6.14)

the influence of the packaged commodity on the migration of the surface treatment, the type of film-forming agent (inert carrier) used to maintain the active deposit on the paper surface, the type of emulsifier used in preparing the wax emulsions, the surface absorbency of the packaging material, and the length of storage time the pack is required to undergo.
[2 figures, 6 tables, 7 references] LB

4.29 PHOTOCHEMICAL REACTIONS OF UNSATURATED FATTY ACID METHYL ESTERS. II. PHOTO-DIMERIZATION REACTIONS OF METHYL 8-ELEOSTEARATE IN CCl_4, AND CCl_3H SOLUTIONS

Suzuki, Osamu, and Tetsutaro Hashimoto (Government Chemical Industrial Research Institute, Tokyo, 1-chōme, Hon-machi, Shibuya-ku, Tokyo, Japan) (In Japanese; figures, tables, and summary in English)
Journal of Japan Oil Chemists' Society 20, No. 3, 143-148 (1971)

The photo-dimerization reactions of methyl 8-eleostearate were studied. When irradiated with light of high pressure mercury lamp, methyl 8-eleostearate was also observed to form the dimer in CCl_4 and in CCl_3H solutions as well in n-heptane. However, the dimer of the eleostearate obtained by illumination with light in CCl_4 or CCl_3H was chlorinated. It is therefore considered that the eleostearate reacts with CCl_4 or CCl_3 to give chlorinated dimer in these reactions.

From the results of analysis of kinetic data obtained, the disappearance of the eleostearate was observed to be in closest agreement with first order reaction in CCl_4 as well in n-heptane, but that in CCl_3H does not agree with the first order reaction. The rates determined showed that the disappearance of the eleostearate in CCl_4 is about six times as fast as that in n-heptane.
[8 figures, 3 tables, 7 references] Authors' abstract

4.89 SYNTHESIS OF POLYIMIDES BASED ON POLYUNSATURATED FISH OIL ESTERS

Henry, Richard P. (North Dakota State Univ., Fargo, N. Dak.)
Chemical Abstracts 74, No. 18, 88232u (May 3, 1971)

3.2380 (9.6)(6.14) APPLICATION OF POLYMERS IN THE FISH INDUSTRY

Balamutov, A. S., M. A. Brudastova, and A. I. Ilyukhin
Pishchevaya promyshlennost, Moscow, U.S.S.R., 50 pp. (1968) 17 k. (In Russian)
Food Science and Technology Abstracts 3, No. 3, 3R82, 498 (March 1971)

This book is intended for hydrologists and for technical personnel working in the fish industry. It describes the characteristics and physicochemical properties of polymer materials, methods of sealing them, and their use in the production of granulated fish food. LB

Holge Bazar, M.N.C.L.U.K.E-1.

6.32 THE DISTRIBUTION OF STEROLS IN ALGAE

Patterson, Glenn W. (Department of Botany, University of Maryland, College Park, Md. 20740)
Lipids 6, No. 2, 120-127 (February 1971)

Sterols have been isolated from all major groups of living organisms; cholesterol is the primary sterol of higher animals, and cholesterol or a complex mixture of 27-, 28-, or 29-carbon sterols is found in lower animals. In primitive animals, the 28- and 29-carbon sterols apparently result from their diet; synthesis by animals of the sterols has not been demonstrated.

Red algae (Rhodophyta) contain primarily cholesterol, but several species contain large amounts of desmosterol and one species contains primarily 22-dehydrocholesterol. A few red algae contain traces of C-28 and C-29 sterols.

Brown algae (Phaeophyta) contain primarily fucosterol; they also contain traces of cholesterol and biosynthetic precursors of fucosterol.

The sterols of green algae (Chlorophyta) are varied and complex; they contain a complex mixture of sterols such as occur in higher plants. The green algae contain chondrillasterol, poriferasterol, 28-isofucosterol, ergosterol, cholesterol, and other sterols.

Sterol composition of algae may be useful information in the taxonomy of and the understanding of the evolution of algae and higher plants. Also, such information may provide clues to the eventual understanding of the specific roles of sterols in plants.

[4 figures, 4 tables, 42 references] FTP

7.80 (1.85) COMPARISON OF EXTRACT-RELEASE VOLUME, pH, AND AGAR PLATE COUNT OF SHRIMP

Vanderzant, C., and R. Nickelson (Animal Science Department, Texas A&M University, College Station, Tex. 77843)
Journal of Milk and Food Technology 34, No. 3, 115-118 (March 1971)

The quality of stored, iced shrimp is determined mainly by organoleptic tests, which frequently lack uniformity and contribute little to the information about the shrimp's potential shelf life. Various tests have been proposed as a simple, rapid means of determining sanitary quality and expected storage life of the raw product--levels of glycogen-sugar content, lactic acid, acid-soluble orthophosphate, trimethylamine nitrogen, amino nitrogen, hydration of water-insoluble protein, pH, and bacterial count, for example. But most of these tests require investment in laboratory equipment and trained personnel, and, except for pH determinations, they are time consuming. And in addition, although high bacterial counts are unacceptable, they do not always indicate the extent of spoilage or quality loss.

Several researchers have reported that the hydration capacity of meat protein, expressed as Extract-Release Volume (ERV), can be used to determine the degree of freshness of meat--the water-holding capacity increases (that is, ERV decreases) as spoilage advances. In 1970, Adamcic and Clark used this principle to evaluate the microbial quality of poultry. The present authors compared the changes in ERV, bacterial count, and pH in ice-stored white shrimp (Penaeus setiferus).

The shrimp were tested initially, in the laboratory, within 4 hr. of being caught. During 24 days of storage at 5° C., their pH gradually increased. During

(over)

7.595 (4.60) A SIMPLIFIED METHOD FOR THE EVALUATION OF ANTIOXIDANTS

Miller, H. E. (General Mills, Inc., James Ford Bell Technical Center, 9000 Plymouth Ave., Minneapolis, Minn. 55427)
Journal of the American Oil Chemists' Society 48, No. 2, 91 (February 1971)

The method described here for rapid evaluation of antioxidants is a simplification of the method developed by G. J. Marco [Journal of the American Oil Chemists' Society 45, 594 (1968)]. Dilute aqueous emulsions of an antioxidant, carotene, and lipid are prepared and placed in spectrometer tubes. The oxidative destruction of the carotene in the emulsion is observed directly with a colorimeter. The value of the antioxidant is determined according to its effectiveness on the rate of decolorization of the carotene.

[1 figure, 1 reference] FTP

7.9 (9.19) THERMAL MAPPING OF STREAMS FROM AIRBORNE RADIOMETRIC SCANNING

Atwell, B. Houston, R. B. MacDonald, and Luis A. Bartolucci (Laboratory for Applications of Remote Sensing, Purdue University, West Lafayette, Ind. 47906)
Water Resources Bulletin 7, No. 2, 228-243 (April 1971)

The authors briefly review radiation theory as applied to determination of water temperature and discuss the errors introduced into radiant temperature measurements by the nonblackness of the water surface and the effects of the atmosphere. The airborne multispectral scanner system used to collect the data presented in the paper is described and points of interest of several thermal maps made with the system are discussed.

[7 figures, 1 table, 9 references] LB

Krauze, Stanislaw, Regina Olędzka, and Zofia Buczyńska (Zakł. Badania Środków Spożyw. Akad. Med., Warsaw, Poland)
Chemical Abstracts 73, No. 21, 108418p (November 23, 1970)

7.51 ENZYMIC DIGESTION IN VITRO OF ANIMAL PROTEINS.
(1.50)(1.92) II. DIGESTIBILITY OF RAW FISH AS WELL AS
(1.61)(1.20) FISH SUBJECTED TO THERMAL TREATMENT

Golovin, A. N., and V. V. Antikhovich (U.S.S.R.)
Chemical Abstracts 74, No. 9, 41198s (March 1, 1971)

7.53 (6.132) ACCELERATED METHOD FOR DETERMINING THE FAT CONTENT IN FISH MEAL

8. NUTRIENT ANALYSIS OF AEROSPACE FOODS
(8.0)(8.42)

Moore, Jerry L., Roy E. Chapin, and John E. Vanderveen (Wisconsin Alumini Research Foundation, Madison, Wis.)
Final Rept. Sep 66-Feb 69, SAM-TR-70-75, 18 pp. (November 1970) Available from the National Technical Information Service, Operations Division, Springfield, Va. 22151. Order No. AD-717 859, PC$3.00, microfiche 95¢.
Government Reports Announcements 71, No. 6, 37 (March 25, 1971)

Concentrations of energy, fat, nitrogen, chloride, and the cations of 14 different metallic elements were measured in 219 samples of 74 space food items. Although the compiled data do not permit calculation of 'standard values,' this tabulation will be a useful reference for those interested in the nutritive quality of state-of-the-art, space-type food items. (Author) Reprinted

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6.60 SCIENTISTS SEARCH FOR DRUGS FROM THE SEA

Anonymous
Chemical and Engineering News 49, No. 23, 24-25 (June 7, 1971)

The article briefly discusses some of the research being carried out by various persons and laboratories on marine sources for drugs, prostaglandin precursors, polysaccharides, and toxins of unexpected use. FTP

7.9 TESTING PLANT MATERIALS FOR DETECTION OF OXYGEN-DEFICIENT
(9.17) WATER IN PONDS

Dendy, J. S. (Agric. Exp. Sta., Auburn Univ., Auburn, Ala.)
Proc. of FAO World Symposium on Warm-water Pond Fish Culture, Rome, Italy, 18-25 May 1966: FAO Fish. Rep. 44, No. 4, 475-479 (1966)
Sport Fishery Abstracts 16, No. 1, Abstract No. 13082, 71 (1971)

An easy method of determining the extent of oxygen deficiency in ponds, using the staining qualities of plant materials, is described. Woods, barks, leaves, and fruits of many kinds of plants stain dark in pond water that contains less than approximately 0.2 ppm dissolved oxygen, whereas they do not stain in well-aerated water. Stain results from the reaction of ferrous iron in the water with tannic acid in plant materials. Suitable woods stained within 10 to 15 minutes in laboratory tests, and within 30 to 45 minutes in pond tests. Both fresh and dried materials stained in oxygen-deficient pond water. (Auth.) Reprinted

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7.42 METHYLMERCURY IN FISH. A TOXICOLOGIC-EPIDEMIOLOGIC EVALUATION
(9.19)(0.4) OF RISKS

Berglund, Fredrik, Maths Berlin, Gunnar Birke, Rune Cederlof, Ulf Von Euler, Lars Friberg, Bo Holmstedt, Erland Jonsson, K. Luning, et al. (Stockholm, Sweden)
Chemical Abstracts 74, No. 19, 98243g (May 10, 1971)

7.879 SIMPLE AND RAPID METHOD FOR ESTIMATING THE FRESHNESS OF FISH

Kobayashi, Hiroshi, and Hitoshi Uchiyama (Inst. Marine Prod. Tokai Ku, Tokyo, Japan)
Chemical Abstracts 74, No. 7, 30810j (February 15, 1971)

7.80 (1.85)

the first 6 or 7 days, ERV increased and bacterial count remained unchanged; but from then on, ERV decreased and bacterial count increased rapidly. Tests on commercial iced shrimp taken from boats as they arrived at the processing plant revealed little correlation between ERV and bacterial count, ERV and pH, and bacterial count and pH.

The authors conclude that the ERV test, as used for beef and poultry, cannot be used to test the freshness of stored iced shrimp. At first blush it would seem that the decrease in ERV after 7 days could be used as an index of sanitary quality. However, the gradual increase of ERV during early storage would affect such usage. For example, the ERV of shrimp stored for 16 days at 5° C. (and spoiled) is similar to that stored for 2 days. The authors note that their data support the view that the pH of shrimp can be used as a simple screening test for freshness. LB
[7 figures, 10 references]

6.72 WHALE HEPARIN
(1.953)

Yamauchi, Fumio, Toshimitsu Kotoku, and Zensaku Yoshizawa (pat.)
Japanese Patent 69 31,589 [31589/69]
Chemical Abstracts 72, No. 14, 70618t (April 6, 1970)

8.59 BIOSYNTHESIS OF ASTAXANTHIN. III. CAROTENOIDS IN SEA BREAMS
(9.13)(1.9)

Katayama, Teruhisa, Kenji Hirata, Henry Yokoyama, and Clinton O. Chichester (Fac. Fish., Univ. Kagoshima, Kagoshima, Japan)
Chemical Abstracts 74, No. 9, 39768j (March 1, 1971)

8.51 (9.13)(1.92) SEASONAL VARIATION IN PROTEIN CONTENT OF BLUEGILL PITUITARY GLANDS

Laarman, Percy W. (Institute for Fisheries Research, Michigan Department of Natural Resources, Museums Annex, Ann Arbor, Mich. 48104)
Transactions of the American Fisheries Society 100, No. 2, 360-362 (April 1971)

The purpose of this study was to measure the seasonal variation in protein content of pituitary glands of the bluegill, Lepomis macrochirus Rafinesque. This report makes no attempt to delve into the intricate physiological functions of the pituitary gland, but rather presents data that may be of interest to fishery biologists who are working in the area of fish metabolism.

(over)

9.13 GILL SAMPLING AS A METHOD OF FOLLOWING BIOCHEMICAL CHANGES: ATPASE ACTIVITIES ALTERED BY OUABAIN INJECTION AND SALT WATER ADAPTATION

Zaugg, W. S., and L. R. McLain (Western Fish Nutrition Laboratory, Bureau of Sports Fisheries and Wildlife, U.S. Department of the Interior, Cook, Wash. 98605)
Comparative Biochemistry and Physiology 38, No. 3B, 501-506 (March 15, 1971)

In studying the effects of biologically active agents on biochemical reactions in animal tissues, the activities before and after exposure to the substance must be tested. The authors suggest that the use of fish offers a unique opportunity to study before and after effects of a wide variety of treatments in a single experimental animal. They developed a method for sampling gills of individual fish and used it to follow changes in ATPase activities resulting from ouabain injection or salt-water adaptation of coho salmon (Oncorhynchus kisutch). They found that ouabain inhibited Na^+, K^+-stimulated ATPase activity by 40 to 50% in microsomes of fresh-water fish and by 80 to 90% in those adapted to salt water. They suggest that a decrease in Mg^{2+}-dependent ATPase activity (which accompanies increased Na^+, K^+-stimulated activity as coho salmon adapt to salt water) may reflect conversion of one form of the enzyme to another.
[2 figures, 2 tables, 7 references] FTP

9.10 COMMON FOOD FISHES OF TAIWAN

Yang, Hung-Chia (Taiwan Fisheries Research Institute), and Tung-Pai Chen (Fisheries Division, Joint Commission on Rural Reconstruction)
JCRR Fisheries Series No. 10, 98 pp. (March 1971) (Joint Commission on Rural Reconstruction, Taipei, Taiwan, Republic of China)

Ninety species (70 species of fin fish; 10 species of molluscs, 7 species of crustaceans, 2 species of marine mammals, and 1 species of reptile) are included in this booklet. Information (in Chinese) on the fisheries of each species is given in brief. Also, notes in English are given about each species. Each species is illustrated by a drawing. FTP

9.13 (9.19) UPTAKE OF ^{137}Cs IN SOME MARINE ANIMALS IN RELATION TO TEMPERATURE, SALINITY, WEIGHT AND MOULTING

Lucu, Čedomil, and Olga Jelisavčić (Center for Marine Research, Institute "Rudjer Bošković," Rovinj, Yugoslavia)
Internationale Revue der Gesamten Hydrobiologie 55, No. 5, 783-796 (1970)

Because of its long physical and biological half-life, cesium is a dangerous radionuclide to man. The authors examined mussels (Mytilus galloprovincialis L.), green crab (Carcinus mediterraneus Csrn.), and blenny fish (Blennius sp.) for the effect of biotic and abiotic factors on their uptake of ^{137}Cs. In crab, the biological half-life is decreased fourfold as the temperature is increased from 10° to 20° C.; in mussels, no effect was observed; in blenny, ^{137}Cs uptake increased at 20° C.

In 100% sea water (34.99‰), the biological half-life in mussels and crabs is from 20 to 30 hours. At lower salinities, the biological half-life is prolonged 1.2- to 1.7-fold. In 75% sea water (27.97‰), the values of the concentration ratio in equilibrium are increased 1.1- to 1.5-fold; in 50% sea water (18.95‰), 1.6- to 1.8-fold; and in 25% sea water (9.72‰), 2.2- to 2.4-fold.

For the first 2,000 hr., the changes in uptake as a consequence of changes in salinity are negligible in blenny.

The rate of uptake by moulted crabs is significantly high. In the heavier mussels and crabs, biological half-life is more prolonged than in the lighter ones.
[9 figures, 3 tables, 13 references] LB

9.10 MAN-MADE REEFS

Anonymous
Man-made Reef Ecology (California Department of Fish and Game, 1416 Ninth Street, Sacramento, Calif. 95814), 222 pp. (n.d.)
Turner, Charles H., Earl E. Ebert, and Robert R. Given
Fishing News International 10, No. 4, 56 (April 1971)

In 1958, the California Department of Fish and Game began an Ocean Fish Habitat Development Project to determine how practical man-made reefs constructed in Southern California waters might be. The Department's researchers built reefs of automobile bodies, streetcars, and quarry rock. After several years of studying the reefs, they have drawn conclusions about the best materials to use for the structures and the possible returns to fishermen. The findings and conclusions are discussed in detail in this report. LB

9.10 A PRELIMINARY STUDY OF CANANDAIGUA LAKE IN 1970 (1.0118)

Eaton, Stephen W., and Lesley Jan Moffett (Division of Sciences, St. Bonaventure University, St. Bonaventure, N.Y.)
Science Studies 27, 69-85 (1971) (St. Bonaventure University, St. Bonaventure, N.Y.)

The authors suggest that the alewife, Alosa pseudoharengus (common since 1953) may be changing the zooplankton populations of Canandaigua Lake. The article gives a history of the changes in fish populations of the lake.
[1 figure, 6 tables, 16 references] FTP

9.13 GLYCOLYSIS AND GLUCONEOGENESIS IN THE GIANT SCALLOP, PLACOPECTEN MAGELLANICUS (GMELIN)

O'Doherty, P. J. A., and L. A. W. Feltham (Department of Biochemistry, Memorial University of Newfoundland, St. John's, Newfoundland, Canada)
Comparative Biochemistry and Physiology 38, No. 3B, 543-551 (March 15, 1971)

Succinate appears to be the main end product of glycolysis in both the mantle and the adductor muscle of the giant scallop.
[4 tables, 33 references] FTP

9.13 THE CHANGES IN THE NON-PROTEIN NITROGENEOUS CONSTITUENTS OF MUSCLE DURING THE ADAPTATION OF THE EEL ANGUILLA ANGUILLA L. FROM FRESH WATER TO SEA WATER

Huggins, A. K., and L. Colley (Department of Biochemistry, University College London, Gower Street, London WC1E 6BT, England)
Comparative Biochemistry and Physiology 38, No. 3B, 537-541 (March 15, 1971)

Na, K, tissue water, total ninhydrin-positive material, individual free amino acids, ethanolamine, cystathionine, and carnosine were measured in the muscle tissues of eels adapted to either fresh water or to sea water. Total free amino acids increased in the muscle on adaptation of the eels to sea water. This increase was accounted for by changes in alanine, glutamine, glutamic acid, glycine, proline, tryosine, and cystathionine content (carnosine, ethanolamine, and the remaining amino-acid content did not change appreciably).
[2 tables, 19 references] FTP

8.51 (9.13)(1.92)

Table 1.--Seasonal changes in pituitary protein content, pituitary size and fish growth for the bluegill in 1969

Month	Protein per pituitary (mg)	Pituitary weight (mg)	Total length of fish (mm)	Index of pituitary weight to fish length x 100	Current year's growth (mm)
March	0.0601	0.2556	141	0.181	--
April	0.0790	0.2881	158	0.182	--
May	0.0537	0.2250	137	0.164	10
June	0.1196	0.3125	160	0.191	16
July	0.1304	0.3500	176	0.199	29
August	0.1381	0.2500	182	0.138	58
September	0.1427	0.2500	194	0.129	63
October	0.1453	0.2500	196	0.128	63

The pituitary gland, sometimes called the master gland of the endocrine system, is involved in an intricate way in regulating physiological processes through secretion of various hormones. If the seasonal variation in the protein content of the pituitary gland, as noted in this report, is typical of all temperature-zone fishes, then great care must be taken in evaluating experiments in which fish metabolism is a factor. The response of experimental fish might be significantly different during two different times of the year, even under otherwise controlled conditions. [1 figure, 1 table, 6 references] Reprinted in part

9.12 SELF RIGHTING BY TRIDACNID CLAMS

Fankboner, Peter V. (Biology Department, University of Victoria, Victoria, British Columbia, Canada)
Nature 230, No. 5296, 579-580 (April 30, 1971)

Three of the six species of clams constituting the family Tridacnidae (Tridacna crocea, T. maxima, and T. squamosa) live byssally attached to dead coral or to limestone during the whole of their adult lives; the remaining three (T. gigas, T. derasa, and Hippopus hippopus) live byssally anchored as juveniles but the adult clams take up unattached existence on coral rubble or packed sand. Because of thickening of the umbones and the subsequent lowered center of gravity of the unattached tridacnids, their usual upright posture on the substratum (their umbones and hinge lines rest on the substratum) is not upset in normal surf and current conditions. During storm conditions, however, some clams are toppled by the increased wave force. The author found that the toppled clams go through a righting response in order to regain their original position. The toppled clam's single adductor muscle completely relaxes and the elasticity of the hinge ligament springs the clam's valves widely apart. As the valves spread apart, the uppermost umbone is displaced to one side--this displacement unbalances the clam and causes it to roll over to its normal upright position.
[2 figures, 5 references] FTP

9.13 THE RELATION BETWEEN EXERCISE AND BIOCHEMICAL CHANGES IN RED AND WHITE MUSCLE AND LIVER IN THE JACK MACKEREL, TRACHURUS SYMMETRICUS

Pritchard, Austin W. (Zoology Department, Oregon State University, Corvallis, Oreg. 97331), John R. Hunter, and Reuben Lasker (National Marine Fisheries Service, Fishery-Oceanography Center, La Jolla, Calif. 92037)
Fishery Bulletin 69, No. 2, 379-386 (April 1971)

The objective of this study was to re-examine the metabolic and locomotor roles of red and white muscle by measurement of glycogen, lactate, and fat levels in the muscle and glycogen levels in the liver in fish exposed to various velocity treatments of known strength and duration. Juvenile jack mackerel, Trachurus symmetricus, were used in this study because the maximum sustained speed threshold for 6 hr. of continuous swimming had already been established for this species (Hunter, 1971), and consequently we were able to relate all of our chemical measurements to known levels of swimming performance.

Glycogen, lactic acid, and fat concentration in red and white muscle and glycogen in the liver of jack mackerel, Trachurus symmetricus, were measured after periods of forced swimming by Trachurus at speeds above, below, and at the sustained speed threshold. Failure to swim at any speed was associated with an almost complete depletion of glycogen in the white muscle only. The trend of glycogen use in the red muscle closely followed that of the liver and was not correlated with failure to swim. Reduction of glycogen levels in red muscle and liver were associated with extended periods of swimming. High lipid content was characteristic of red muscle and was insignificant in white muscle. Lipid use was

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9.16 CATTLE PRECONDITIONING, CATFISH COMPLEMENT TEXAS FIRM'S GRASS OPERATION

Boykin, John E.
Feedstuffs 43, No. 20, 17-18 (May 15, 1971)

The basic product of a Brazos River (Texas) firm is Bermuda grass, which is used as hay for custom-feeding calves. To provide the water required for the 750 acres on which the grass is grown, a 30-acre reservoir was built. This reservoir is the focus of a profitable catfish operation. In the spring when the reservoir is full, some 100,000 catfish fingerlings are planted there. For about 7 months the fingerlings are fed 3% of their body weight per day with a high-protein (32%) catfish pellet consisting of soybean, fish, and blood meals plus trace elements and some dehydrated alfalfa. The ratio of fish gain to feed supplied is almost 1:2.

Throughout the season, about 15,000,000 gal. of water a day is pumped from the Brazos into the reservoir; thus the oxygen content of the water is adequate even if overfeeding should occur. Since slightly more water is used for irrigation than is pumped in, the water level gradually recedes, becoming relatively low at fish-harvest time. At this time, the fish will average about 1.5 lb. and will have a market value of $1.20 each (about $120,000 in all). The original fingerlings cost about 12¢ each ($12,000 in all); they were fed about 150 tons of feed costing about $105 a ton ($15,750 in all). Only one full-time man is required to handle the day-to-day operation. However, other ranch hands are called in to help at planting and harvesting times.

(over)

9.16 (1.89) THE CULTURE AND MAINTENANCE OF THE LOLIGINID SQUIDS SEPIOTEUTHIS SEPIOIDEA AND DORYTEUTHIS PLEI

La Roe, E. T. (School of Marine and Atmospheric Sciences, University of Miami, Miami, Fla.)
Marine Biology 9, No. 1, 9-25 (April 1971)

Because of their abundance, squid are potentially one of the largest fishery resources in the marine environment. The large dorsal axons in some species make them a prime investigative tool for nerve physiologists. They are a principal food source for large fishes, marine mammals, and some aquatic birds. Thus a reliable supply of living, cultured animals could be of benefit to a range of research and commercial activities.

The author's primary goal was to learn how to keep specimens alive for extended periods of time. He approached the problem from two sides: by adapting adult squids to confinement and by rearing specimens from eggs to mature adulthood. Choice and quantity of food was the most important factor in the squids' survival--they ate at a rate of 30 to 60% of their body weight per day, starving if intake fell below 10 or 15%. Growth was rapid and steady, averaging about 20 mm. a month. Lethal minimum salinity was about 27‰; lethal temperatures were 17° or 18° C. minimum and 32° or 33° C. maximum. The young used 0.64 µl. of oxygen per milligram wet weight per hour. Opaque tanks lighted with ultraviolet light and having a seminatural substrate on the bottom gave best maintenance results. [13 figures, 3 tables, 42 references] LB

9.19 (0.8) SUMMARY OF INTERIM GUIDELINES FOR DISPOSAL OF SURPLUS OR WASTE PESTICIDES AND PESTICIDE CONTAINERS

Anonymous
Rept No. WGP-DS-1, 30 pp. (December 1970) (Working Group on Pesticides, Rockville, Md.) Available from the National Technical Information Service, Operations Division, Springfield, Va. 22151. Order No. AD-720 391, PC $3.00, microfiche 95¢.
Government Reports Announcements 71, No. 9, 51-52 (May 10, 1971)

An interim guideline for surplus or waste pesticides and pesticide container disposal has been drawn from the combined important points of three Working Group Reports. Presented in concise form for ready reference, the subjects of ocean disposal (not recommended), ground disposal and incineration (air disposal) are reviewed. Orientation is to different pesticide users: householders, farm operators, commercial operators, governmental authorities, industrial users, formulators, manufacturers. Ground disposal, its attendant precautions and controls, are described as well as methods and disposal site requirements. Incineration technology to date is outlined as the most applicable method of disposal for large amounts of toxic wastes and unusable pesticides. Sections on collection systems as practiced and recommended in various areas including transportation of surplus pesticides and containers, storage considerations with fire and safety precautions, disposal site monitoring and suggested research bring the whole problem into focus. The summary of guidelines provides preliminary guidance with expectation of revision when more definitive solutions are available. (author) Reprinted

9.19 BIOLOGICAL METHOD TESTS RIVER POLLUTION

Anonymous
Chemical and Engineering News 49, No. 23, 31 (June 7, 1971)

A new method for measuring the effects of chemical pollution in lakes and streams has been developed and tested successfully. The work was carried out under the direction of John Cairns, Jr., Virginia Polytechnic Institute, Blacksburg, Va., under a grant from the Manufacturing Chemists Association. The technique, termed the Sequential Comparison Index, is based on examination of samples of bottom-dwelling organisms from a stream and determination of the organisms in the samples. The technique can be carried out by technicians with no training in biology. FTP

9.16

The fish grown on the Brazos River farm are marketed in several forms. Two of the retail outlets specialize in live fish. Several large restaurants in the area buy them for use as a gourmet item. But most of the harvest is sold on contract to a large frozen-food concern.

[6 photographs] LB

9.12 PROTECTION OF HERMIT CRABS (DARDANUS SPP.) FROM OCTOPUS BY COMMENSAL SEA ANEMONES (CALLIACTIS SPP.)

Ross, D. M. (Zoology Department, University of Alberta, Edmonton, Alberta, Canada)
Nature 230, No. 5293, 401-402 (April 9, 1971)

The hermit crab, by carrying the sea anemones on its shell, is protected (presumably by the nematocysts of the anemones) from the octopus, a creature that otherwise would be a most effective predator.
[1 figure, 2 tables, 9 references] FTP

9.13

slow and not correlated with fatigue. A decline in lipid concentration after exercise occurred only in the red muscle and only after a swimming period of 6 hr at a subthreshold speed. High lactate levels were characteristics of both muscle types and did not appear to be related to fatigue at any swimming speed.

The high lactate levels in white muscle, the almost complete depletion of glycogen in the white muscle of exhausted fish, and the parallel pattern of glycogen depletion in red muscle and liver suggested that white muscle was the primary locomotor organ near and above the threshold for sustained speed. At these speeds red muscle like the liver may provide nutrients to the white muscle, provided time for mobilization is sufficient. At speeds below the sustained speed threshold our analysis indicated that both the red and white muscle systems were used but the relative significance of the locomotory role played by each system could not be evaluated.

[3 tables, 22 references] Reprinted in part

9.19 WATER GETS WORSE
(9.6)

Anonymous
Nature 230, No. 5295, 486-487 (April 23, 1971)

The article discusses the critical report "Water Wasteland" [edited by David R. Zwick and Marcy Benstock, Center for Study of Responsive Law, Washington, D.C. (1971), price $25] on the attempts made by government and industry to abate water pollution in the United States. FTP

9.19

The analysis shows that man initiates the translocation of compounds of sulfur over great distances through combustion of fuel. Selenium is mobilized to a much lesser extent than sulfur is, perhaps because of the differences in the chemical and physical properties of the tetravalent oxides. The ratio of selenium to sulfur in glacial ice is characteristic of terrestrial matter; these elements appear in ice sheets through the formation of volatile compounds in biological processes.

[1 table, 11 references] FTP

9.19 SELENIUM AND SULFUR IN A GREENLAND ICE SHEET: RELATION TO FOSSIL FUEL COMBUSTION

Weiss, Herbert V. (Naval Undersea Research and Development Center, San Diego, Calif. 92132), and Minoru Kotke, and Edward D. Goldberg (Scripps Institution of Oceanography, University of California, San Diego, La Jolla, Calif. 92037)
Science 172, No. 3980, 261-263 (April 16, 1971)

9.16 (6.31) THE TRANSPLANTING AND SURVIVAL OF TURTLE GRASS, THALASSIA TESTUDINUM, IN BOCA CIEGA BAY, FLORIDA

Kelly, John A., Jr., Charles M. Fuss, Jr., and John R. Hall (National Marine Fisheries Service, Biological Laboratory, St. Petersburg Beach, Fla. 33706)
Fishery Bulletin 69, No. 2, 273-280 (April 1971)

Turtle grass was transplanted to an unvegetated, dredged canal and a hand-cleared portion of a flourishing grass bed. Complete or partial success was attained in 7 of 14 methods used. The best method, in which short-shoots (rhizomes removed) were dipped in a solution of plant hormone (Naphthalene Acetic Acid) and attached to construction rods for transplanting, was 100% successful and may be suitable for general application.

[5 figures, 2 tables, 8 references] Authors' abstract

9.16 ASPECTOS SÔBRE A CRIAÇÃO DA CARPA (CYPRINUS CARPIO).
[ASPECTS OF RAISING CARP, CYPRINUS CARPIO]

Stempniewski, Hélio Ladislau
Equipesca Jornal 8, No. 38, 6-8, 11 (April 1971) (In Portuguese) (Equipesca Equipamentos de Pesca S/A, Rua Dr. Pinto Ferraz 1142, Campinas--Estado de São Paulo, Brazil)

The raising of carp, a cosmopolitan fish, is described herein, from the choice of spawning stock, through the tanks needed at various stages of the fishes' growth, their food, and their fattening, to the best methods of butchering for market and for transport.
[2 figures] LB

9.19 (9.13) THE UPTAKE AND DISTRIBUTION OF CHLORINATED RESIDUES BY GOLDFISH (CARASSIUS AURATUS) FED A ^{14}C-DIELDRIN CONTAMINATED DIET

Grzenda, Alfred R., William J. Taylor, and Doris F. Paris (Federal Water Quality Administration, Southeast Water Laboratory, College Station Road, Athens, Ga. 30601)
Transactions of the American Fisheries Society 100, No. 2, 215-221 (April 1971)

When goldfish (Carassius auratus) were fed at regular intervals with ^{14}C-dieldrin contaminated food, they exhibited a rapid initial uptake of radioactivity followed by a period in which the uptake rate was considerably reduced. The concentration of radioactivity in the tissue was found to increase continuously during the course of the investigation.

Tissues from fish fed on a diet containing a high concentration of dieldrin were shown to accumulate higher concentrations of radioactivity and at greater rates than those exposed to a lower concentration of toxicant.

It was also found that tissues from fish exposed to the lower dieldrin concentration took up a higher percentage of the available radioactivity than did tissues from fish exposed to higher concentrations.

Analysis of individual tissues revealed that, in all cases, mesenteric adipose tissue and testes contained the highest concentrations of radioactivity, while muscle and blood had the lowest.

Thin-layer chromatography of tissue extracts failed to reveal any radioactive metabolites derived from dieldrin.

[1 figure, 5 tables, 10 references] Authors' abstract

9.19 (9.2)(9.3) THERMAL POLLUTION -- A CAUSE FOR CONCERN

Cairns, John, Jr. (College of Arts and Sciences, Virginia Polytechnic Institute, Blacksburg, Va.)
Journal of Water Pollution Control Federation 43, No. 1, 55-66 (January 1971)

Expanded production of electric power and increased discharge of heated wastewater into the aquatic environment cannot be continued indefinitely without causing a major ecological crisis. The major effects of heat pollution on higher level aquatic organisms are: (1) Death of the organisms through direct effects of heat; (2) Functional aberrations in the organisms, such as change in respiration or growth; (3) Death of the organisms through indirect effects of heat involving reduced oxygen supply, disruption of food supply, and decreased resistance to toxic substances; (4) Interference with spawning or other critical activities in the life cycle of the organism; and (5) Competitive replacement of the aquatic organisms by more tolerant species as a result of the precedingly stated physiological effects.

Four basic alternatives are open relative to the heated wastewater problem. They may be applied singly or in combination. They are: (1) To place all heated wastewater in streams, lakes, and oceans without regard to the effect--environmental damage would be accepted as a necessary consequence of the demand for increased power; (2) to use, but not abuse, present ecosystems--heated wastewater discharge would be regulated to fit the receiving capacity of the ecosystem; (3) to find alternative ways to dissipate or to use waste heat beneficially; and (4) to modify ecosystems to fit the new temperature conditions.

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9.19 (9.13) A PROPOSAL: EXCHANGE EQUILIBRIA CONTROL THE DEGREE CHLORINATED HYDROCARBONS ARE BIOLOGICALLY MAGNIFIED IN LENTIC ENVIRONMENTS

Hamelink, Jerry L., (present address: Department of Forestry and Conservation, Purdue University, Lafayette, Ind. 47907), Ronald C. Waybrant, and Robert C. Ball (Department of Fisheries and Wildlife, Michigan State University, East Lansing, Mich. 48823)
Transactions of the American Fisheries Society 100, No. 2, 207-214 (April 1971)

The dynamics of DDT in lentic environments were studied in a farm pond and four artificial ponds. A hypothesis that biological magnification of pesticides was dependent on passage of the residues through a food chain was rejected and a hypothesis that accumulation depends on adsorption and solubility differences was proposed. The mechanism proposed is based on the principle that compounds are exchanged between water and fats. Exchange in fish passes through two stages, from water to blood and from blood to fats, permitting a high degree of magnification in fish. The proposed mechanism accounts for the reported observations that pesticides are excreted by fish, that body load of pesticides increases as the fat content of fish increases, that pesticide magnification by fish is inverse to the water solubility of the compounds and that pesticides persist longer in oligotrophic than eutrophic lentic ecosystems.

[5 figures, 2 tables, 33 references] Authors' abstract

9.2 (9.10) FISHERY-ADVISORY INFORMATION AVAILABLE TO TROPICAL PACIFIC TUNA FLEET VIA RADIO FACSIMILE BROADCAST

Laurs, R. Michael (National Marine Fisheries Service, Fishery-Oceanography Center, P.O. Box 271, La Jolla, Calif. 92037)
Commercial Fisheries Review 33, No. 4, 40-42 (April 1971)

Fishery-advisory information is being transmitted to the tropical Pacific tuna fleet via radio facsimile (FAX) broadcast by the NMFS Fishery-Oceanography Center at La Jolla, California. Two FAX charts containing oceanographic and weather information tailored to fishermen's needs are being transmitted daily (except weekends) to vessels on the fishing grounds in the eastern tropical Pacific by NMFS-licensed radio station WWD at 2300 GMT on frequency 17294.9 kHz.

Sea-state information including swell direction and height, wind-wave height and, once each week, a 7-day sea-surface temperature analysis, is given on one chart....

A second chart provides information on direction and speed of surface winds, location and direction of movement of tropical storms, location of areas of squalls and other inclement weather conditions, and location of the Intertropical Convergence Zone....

Within the next month or so, a weekly analysis of thermocline depth will be included on the charts. Eventually, the location of ocean-surface temperature fronts indicated by infrared temperature measurements made by orbiting satellites and received by the Automatic Picture Transmission...installation at the Fishery-Oceanography Center will be added to the charts. The geographical coverage of the charts is from the American west coast to 140° W between latitudes 30° N and 5° S.

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9.19 (9.16) FLOCCULATION TREATMENT OF RADIOACTIVE CONTAMINATED SEA WATER. I. EXPERIMENTAL STUDIES ON FLOCCULANTS

Sakurai, A., Y. Nagaoka, and Y. Wadachi (Japan Atomic Energy Research Institute)
International Chemical Engineering 11, No. 1, 167-171 (January 1971)

The authors examined the use of flocculation (batch) treatment of radioactive contaminated sea water. The radioactive fission products considered were ^{137}Cs, ^{90}Sr-^{90}Y, ^{144}Ce, ^{147}Pm, ^{106}Ru, and ^{95}Zr-^{95}Nb. They found that ^{137}Cs and ^{106}Ru are flocculated with $Cu_2[Fe(CN)_6]$ (500 p.p.m.) at pH 5-6; ^{144}Cs, ^{147}Pm, ^{95}Zr-^{95}Nb are flocculated with $Ca_3(PO_4)_2$ (500 p.p.m.) at pH 10-11; ^{85}Sr, ^{89}Sr, ^{90}Sr are flocculated with $Ca_3(PO_4)_2$ (2,000 p.p.m.), to which strontium nitrate (500 p.p.m.) is added in advance, at pH 10-11. Addition of polyacrylamide during flocculation facilitates the subsequent dehydration of the sludge.
[11 figures, 3 references] FTP

9.19 UPTAKE OF MERCURY (^{203}Hg) BY TAPES DECUSSATUS L.

Unlu, M. Yasar (Cekmece Nuclear Research Center, Istanbul, Turkey)
Report, 27 pp. (1970) (In Turkish) (U.S. Sales only) Available from the National Technical Information Service, Operations Division, Springfield, Va. 22151.
Order No. NP-18429)
Nuclear Science Abstracts 25, No. 5, 826 (March 15, 1971)

In order to investigate the potential contamination of the seas with mercury, the metabolism of ^{203}Hg in Tapes decussatus was examined. The study indicated that ^{203}Hg, used as chloride, is rapidly accumulated by Tapes decussatus: the weight concentration in the animals was ten times higher within an hour than in the environment. Abstract reprinted in part

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9.2 (9.10)

The fishery-advisory service is being performed on an experimental basis as a means of obtaining valuable environmental data from fishing vessels--and to provide fishermen with information that may assist them in making tactical fishing decisions.
[2 figures] Reprinted in part

9.2 THE STATE OF FOOD AND AGRICULTURE, 1969 (9.6)

Anonymous
Food and Agriculture Organization of the United Nations, Via delle Terme di Caracalla, Rome, Italy
Available from Unipub, Inc., 650 First Ave., New York, N.Y., 207 pp. (1969), Price $6.
N. E. Bednarcyk (reviewer)
Food Technology 25, No. 5, 92 (May 1971)

The book contains statistical and other information on world agricultural production in 1968 and previous years. It has four sections: world review, review by regions, agricultural marketing improvement programs: some lessons from recent experience, and modern institutions to promote forestry development. FTP

9.19 (9.13) COMPORTAMENTO DOS PEIXES, EM RELAÇÃO À POLUIÇÃO [BEHAVIOR OF FISHES IN RELATION TO POLLUTION]

Branco, Samuel Murgel
Equipesca Jornal 8, No. 38, 2-5 (April 1971) (In Portuguese) (Equipesca Equipamentos de Pesca S/A, Rua Dr. Pinto Ferraz 1142, Campinas -- Estado de São Paulo, Brazil)

How much of a particular poison can be tolerated by a population of fishes living in a natural environment? The few answers that we have to that question were derived from observations in the field, not from properly controlled investigations in the laboratory. This article reports the results of such laboratory investigations, including the equipment used. The reaction of fish to various types of waste, to various physical factors, to heavy metals; the "preference" of fish for certain toxic substances; their self-preservation reactions, some of which seem contradictory--all are discussed. Because a major part of the noxious but customary effects of pollution are related to the fishes' respiratory needs, the author classifies the effects into: direct effects of pollution on the content of dissolved oxygen in the water, the effects on the fishes' respiratory organs, and the effects on the internal media that are harmful to cellular respiration. He examines these effects in terms of biochemical oxygen demand, chemical oxygen demand, and thermal oxygen demand--and in light of the effects on the fishes' nervous sytem, normal and spawning behavior, respiratory organs, abnormality of offspring, blood and cellular mechanisms. LB

9.19 (9.2)(9.3) TOXICITY OF PESTICIDES LABELLED WITH RADIONUCLIDES

Wortley, G. (Joint FAO/IAEA Division of Atomic Energy in Food and Agriculture, Vienna)
From Panel on Nuclear Techniques for Studying Pesticide Residue Problems, Vienna, Austria. STI/PUB-252; CONF-681228, pp. 57-65 (1970)
Nuclear Science Abstracts 25, No. 5, 823 (March 15, 1971)

Calculations were made for the assessments of potential radiation hazards resulting from the ingestion of food containing residues from field experiments with radio-labeled pesticides. The radioactivity of food containing residues of maximum commercially available specific activity at concentrations given by the FAO/WHO tolerances was compared with the maximum permissible (ICRP) concentrations of radionuclides in water. Safety factors were given for dieldrin (^{14}C), DDT (^{36}Cl), lindane (^{14}C), ethylene dibromide (^{82}Br), malathion (^{32}P, ^{35}S, ^{14}C, ^{3}H) and phenyl mercuric acetate (^{203}Hg). (auth) Reprinted

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9.3 (9.12) MANIPULATION OF FISH POPULATIONS WITH RESPECT TO FOOD PRODUCTION: A CAUTIONARY NOTE

Walters, Carl J. (Institute of Animal Resource Ecology, University of British Columbia, Vancouver, British Columbia, Canada)
Transactions of the American Fisheries Society 100, No. 2, 365-366 (April 1971)

As understanding of production of organisms used for food by fish increases, biologists may be able to manipulate some fish populations to provide maximum sustainable yield of food to the fish. Superficially this would appear a desirable management policy, because through-put of basic production to fish would be maximized. The purpose of this note is to demonstrate that maximum usable production will be achieved by holding fish populations at lower levels than would result in maximum total food intake.

To demonstrate this assertion, a simple conceptual framework for the long-term relationships among average fish population size (biomass), consumption of food organisms, net production, and yield is presented....total consumption of food by a fish population, C(N) (consumption as a function of N), increases at first with fish population size, then declines if the fish are abundant enough to "overharvest" populations of food organisms. On the other hand, total food requirement for maintenance of the fish population, M(N), increases at least linearly with fish population size. If no food consumption were expended in mortality and reproduction and if the population were not limited by other factors, then it would stabilize at the level where consumption and maintenance curves intersect. The difference between consumption and maintenance...represents net production

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9.6 (9.17) COASTAL LAND RESOURCES CONFERENCE - CONFERENCE PROCEEDINGS

Calhoun, John C., Jr., et al.
Texas A&M University TAMU-SG-71-101, 111 pp. (September 1970)

On June 16 and 17, 1970, the Texas Agricultural Extension Service, in cooperation with the Sea Grant Program of Texas A&M University, held a conference in Galveston to review the activities, problems, and opportunities associated with the coastal areas of Texas. Among the papers presented were the following:

"The Sea Grant Program and Coastal Development," by Dr. John C. Calhoun, Jr., Director of the Sea Grant Program at Texas A&M; pp. 1-5.

" A Perspective of Coastal Land Utilization," by Dr. Daniel C. Pfannstiel, Assistant Director of the Texas Agricultural Extension Service at Texas A&M; pp. 6-12.

"Shrimp Mariculture at the Bureau of Commercial Fisheries Biological Laboratory," by Cornelius R. Mock, Fishery Biologist at the Biological Laboratory in Galveston; pp. 13-21 [1 figure, 3 tables, 2 references].

"Shrimp Farming--Texas Style," by Jack C. Parker, Marine Advisory Program Specialist with the Texas Agricultural Extension Service; pp. 22-26.

"Coastal Industrial Development," by Dr. Paul D. Ludwig, Agricultural Director at the Dow Chemical Company in Freeport (Texas); pp. 39-43 [4 figures].

"Coastal Water Quality," by Dick Whittington, P. E., Director of Field Operations of the Texas Water Quality Board; pp. 61-70 [4 figures, 4 references].

"The Coastal Resources Management Program of Texas--A New Approach for Environmental and Human Dignity," by James T. Goodwin, Coordinator in the Governor's Office of Natural Resources in Austin; pp. 71-75.

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9.6 NEW PUBLICATION SERIES

Anonymous
Biblioteca, Instituto Nacional de Pesca, Carmona y Valle No. 101-503, México 7, D.F.

The National Fisheries Institute of Mexico, a subsidiary of the Secretariat of Industry and Commerce, has launched a new publication series. It comprises three publication categories:

(1) "Serie Investigación Pesquera," consisting of -
Annals (annually issued research results),
Data Lists (information about sampling stations, cruises, etc.), and
Studies (results of a single investigation on some fisheries subject).
Two of these studies have been issued. Estudio No. 1, "Peces mexicanos (claves)" [Mexican Fishes, (Keys)], by José Alvarez del Villar, 166 pages (May 20, 1970), describes 40 families and genera; it contains 62 figures and a complete index of the scientific names used in the text. Estudio No. 2, "Líneas de crecimiento en escamas de algunos peces de México" [Growth Lines in the Scales of Some Mexican Fishes], by M. F. Ruiz Durá, Y. Arenas Orijel, and G. Rodríguez Hernández, 97 pages (November 1970), gives the results of examinations of two clupeiform families, one scopeliform family, one pleuronectiform family, and eight perciform families; it contains 104 figures, 1 table, and 41 references.

(2) "Serie Proyectos," containing studies the results of which are immediately applicable to the fishing industry. Serie proyectos 1, "Plan Nacional para el Desarrollo de Communidades Rurales Pesqueras" [A National Plan for the Development of Rural Fisheries Communities], 48 pages (June 25, 1970), is a state-by-state overview of a segment of the Mexican government's program to raise the

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9.7 (0.8) DIRECTORY OF ENGINEERING COLLEGE RESEARCH AND GRADUATE STUDY

Engineering Education 61, No. 6, 563-766 (March 1971)

Part I of this issue of the journal features articles on topics related to effective teaching, including such aspects as application of learning theory in designing instruction and the reward structure for teaching. The central theme deals with individualizing instruction. Twelve articles are presented (pp. 504-540).

Part II is a directory of "Engineering College Research and Graduate Study Data for 1969-70," from 201 Engineering College and Affiliate Members of the American Society for Engineering Education. It contains information on programs and degree requirements, appointments available for teaching and research assistants, personnel, thesis topics, enrollments, degrees granted, areas and dollar volume of research, and sources of research support. FTP

9.3 SALVAGE LAW

Lewis, C. C., Jr. (San Diego, California)
Oceans 3, No. 6, 57-62 (1970)

When the sea threatens life and property, a well-defined field of jurisprudence comes into effect. The author discusses the origin of salvage law, the subjects of a salvage award, and the nature of the salvage rewards. FTP

9.6

socioeconomic level of populations living in rural sectors. It is a profusely illustrated pamphlet.

(3) "Serie Divulgación," consisting of -

Bulletins (information of interest to fishery scientists and technologists, industrialists, fishermen, and government organizations),

Bibliographies (bibliographic citations of subjects concerned with fishery science, with analytical summaries and notes), and

Instructives (pamphlets giving instruction in the techniques and procedures of fishery-oriented activities). Five of these pamphlets have been issued. Instructivo 1, "Reconocimientos de Huevos y Larvas" [Surveys of Eggs and Larvae], anonymous, 55 pages (1970), has 13 figures, 7 tables, 27 references, and 8 appendices. Instructivo 2, "Pescado blanco (Chirostoma estor) Su Fomento y Cultivo en México" [White Fish (Chirostoma ester), Its Production and Cultivation in Mexico], by Mateo Rosas, 79 pages (July 29, 1970), has 70 figures, 9 tables, and 16 references. Instructivo 3, "Claves Ilustradas para la Identificación de los Camarones Comerciales de la América Latina" [Descriptive Keys to the Identification of the Commercial Shrimp of Latin America], by Isabel Pérez Farfante, 48 pages (August 29, 1970), has 8 multipart figures and 34 references. Instructivo 4, "Manual de Métodos para el Estudio de Larvas y Primeras Postlarvas de Camarones y Gambas" [Manual of Methods for the Study of the Larvae and Early Postlarvae of Shrimps and Prawns], by Sheldon Dobkin, 82 pages (1970), has 30 figures, 1 table, and 101 references. Instructivo 5 "Experimentos de marca-recaptura de camarones" [Experiments in Marking and Recapturing Shrimp], by Richard A. Neal, 38 pages (1970), has 7 figures, 1 table, and 57 references.

Several of these reports are available in English. Instructivo 1 is based on work by K. Sherman and G. L. Kesteven; Instructivos 4 and 5 are direct translations of the English versions. LB

9.7 FOOD INDUSTRY SOURCE BOOK FOR COMMUNICATION
(9.4)(9.3)
(9.6)

Radiske, C. A., H. W. Buzzard, Jr., G. Hansen, and D. Clapp
National Canners Association, 1133-20th Street, N.W., Washington, D.C. 20036, 357 pp. (1970), Price $20
P. A. Lachance (reviewer)
Food Technology 25, No. 5, 91-92 (May 1971)

The book deals with the topic of consumerism and environmentalism as it applies to the food-processing business. FTP

9.6 WORLD FOOD PROBLEMS -- BIBLIOGRAPHY
(9.7)

Lundeen, G. A., and B. Lundeen
Food Science Research Center, 3451 E. Bellaire Way, Fresno, Calif. 93726, 46 pp., (1969), Price $3.00
M. Kroger (reviewer)
Food Technology 25, No. 5, 90 (May 1971)

The bibliography lists about 300 books and reports. FTP

9.3 (9.12)

(food intake usable for growth, reproduction, natural mortality, and yield). Maximum net production would occur at the population size where consumption and maintenance curves are parallel, not at the size that would maximize total consumption of food. That is, maximum net production would occur at the population size for which the additional food intake accruing to an added unit of biomass would just balance the food gathering and metabolic cost incurred by that added unit of biomass. This concept is analogous to that of "surplus production" as defined by Ricker (1958).

Net production, C(N)--M(N), is shown, again as a function of total fish population size,...as P(N). Since loss of production to death and reproduction, L(N), would increase at least linearly with total fish population size, the actual net production usable for yield would be still lower. The slope of L(N) would vary with harvesting policy, since time allowed for growth and number of fish "allowed" to die naturally can be varied through size limits and effort levels.

Net production usable for yield, P(N)--L(N), is shown....Maximum usable production would be realized at the fish population size where total net production and loss curves are parallel, not at the size resulting in maximum net production of fish flesh.

The implication of the "model" presented above is that the biologist must carefully define "best" stocking rates and "best" fish population sizes with respect to food resources. Maximum net production does not appear in itself to be a desirable goal, even from a strictly biological point of view.
[1 figure, 1 reference] Reprinted

9.6 (9.17)

"The Coastal Interface," by Richard J. Hoogland, Fishery Biologist in the Bureau of Commercial Fisheries Biological Laboratory at Galveston; pp. 76-81.

"Raising Catfish in Brackish Water," by W. Guthrie Perry, Jr., with the Louisiana Wild Life and Fisheries Commission in Grand Chenier; pp. 82-103 [7 figures, 4 tables].

"The Caged Culture of Channel Catfish," by Dr. H. R. Schmittou, Fisheries Specialist in the Texas Agricultural Extension Service; pp. 104-111 [1 figure, 1 table]. LB

9.11 THE OCEAN
(9.6)

Revelle, Roger, et al.
International Marine Publishing Co., Camden, Maine, 148 pp. (n.d.), $6.50
National Fisherman 52, No. 2, 12S (June 1971)

In September 1969, Scientific American devoted a special issue to oceanography. [See Commercial Fisheries Abstracts 23, No. 3, 15 (March 1970).] The ten articles that issue contained is now available in book form.
[112 photographs and diagrams] LB

9.17 VIDA SILVESTRE, NO. 1 (MARCH 1971)
(9.6)

López Serrano, Fernando (editor)
Boletín Informativo del Servicio de Pesca Continental, Caza y Parques Nacionales, Goya 25, Madrid-1, Spain

In the introductory apologia of this new quarterly, the chief of the department of continental fishing, game, and national parks states that the principal object of the journal is the inculcationof its readers with an understanding of the fundamental bioecological necessities of each living species, plant and animal, that must share nature's community. Man is custodian of this community. Equilibrium within it is vital to his physical, economic, and spirtual well being. This journal is dedicated to the conservation of all forms of life that enter into that balance.

This first 68-page issue contains four articles concerned with fish: one on the use of electricity to harvest farm-reared fish (with six illustrations), one on the factors affecting natural reproduction in salmonids (with six illustrations and seven literature citations), one on the problems of raising eels commercially (with one illustration), and one on the effects on the Spanish fishery of the introduction of American black bass into Andalusian waters (with one illustration).

The journal is profusely and beautifully illustrated throughout, 47 of its 72 maps and photographs being in color. Annual subscription is 300 Ptas. for subscribers living outside Spain. All articles are in Spanish. LB

9.4 OCEANOLOGY DIRECTORY
(0.8)(9.6)
(9.11)
Anonymous
World Fishing 20, No. 5, 38 (May 1971)

This international directory of companies and organizations engaged in oceanology and underwater engineering was produced on behalf of the Underwater Engineering Group of the Construction Industry Research and Information Association. It contains 150 pages of over 3,000 cross-referenced entries from more than 600 concerns interested in the commercial or scientific aspects of oceanology. The activities of more than 300 British concerns are described in detail; all major European, American, and Japanese manufacturers and contractors are listed. Also contained is a glossary of terms used in underwater work.

The directory is available for £10 from Spearhead Publications Ltd., 2 Fife Road, Kingston-on-Thames, Surrey, England. FTP

9.3 INTERNATIONAL REGULATION OF THE OCEANS AND THEIR RESOURCES
(9.2)(9.4)
Wagner, Michael A.
Brooklyn Law Review 37, No. 2, 402-425 (Winter 1971)

In this article, the author examines two documents--Draft United Nations Convention on the International Seabed Area and the Draft Treaty Covering Exploration and Exploitation of the Ocean Bed (Revision One)--with emphasis on the latter and makes suggestions for the accomplishment of their aims. He concludes that the Treaty is the most viable proposal advanced to date for effective seabed exploration and exploitation. [132 footnotes] FTP

9.2 INTERNATIONAL MARKETING INFORMATION SERVICE. COUNTRY MARKET DIGEST

Anonymous
Report No. IMIS-71-100-IMIS-71-200 (Bureau of International Commerce, Washington, D.C.) Available from the National Technical Information Service, Operations Division, Springfield, Va. 22151. Order No. COM-71-50023, PC 10¢ microfiche 95¢
Government Reports Announcements 71, No. 9, 27 (May 10, 1971)

These reviews by industry and product category identify 10 to 15 most salable products in individual countries. This information will be provided for about 50 leading markets throughout the world, and will be updated periodically.

Reprinted

The report presents basic, authoritative information for exporters, importers, investors, manufacturers, researchers, and those concerned with international trade and economic conditions. Reprinted

Government Reports Announcements 71, No. 9, 27 (May 10, 1971)
D.C., $16.00 per year, $0.15 a copy.
from the Superintendent of Documents, Government Printing Office, Washington,
field, Va. 22151. Order No. COM-71-50018, microfiche 95¢. Paper copy available
from the National Technical Information Service, Operations Division, Springfield, Va. 22151. Order No. COM-71-50018, microfiche 95¢, Paper copy available
Report No. OBR-71 (Bureau of International Commerce, Washington, D.C.) Available
Anonymous

9.2 OVERSEAS BUSINESS REPORTS

9.6 YEARBOOK ISSUE, 1971

Fuller, Nathan S. (ed.)
National Fisherman 51, No. 13, 144 pp. (1971)

This annual roundup of fisheries information contains articles dealing with international management policies and agreements, national politics and legislation, pollution and the environment, vessels and their development, and the status and prospects of particular fisheries--by species and by geographical area. It also has two articles dealing with marine sport fishing; a book-publishing supplement; and two directories: one of the 78 fishery cooperatives in the United States and Puerto Rico (giving for each the name of one of the officers, the number of members, the number of boats owned by members, and the major species of fish caught) and one of Pacific fisheries organizations (giving the address and key personnel of international, Canadian, and United States organizations--the last divided into state, Federal, industrial, individual operators, cooperatives, and unions). The issue ends with indexes of advertisers and of major articles that appeared in the journal during 1970.

Among the contributors are DeWitt Gilbert, A. Denis Clift, Roy I. Jackson, John D. Hayes, Donald J. McKernan, Albert W. Koers, Philip M. Roedel, William O. Foss, Richard J. Myhre, William G. Gordon, Buell Hollister, John Enos, Ian Ellis, Steven E. Hughes, Gordon S. Smith, Richard H. Philips, William A. Stevenson, Frank T. Moss, John Clark, John Frye, Burton T. Coffey, C. Ray Wilmore, Perc Sane, and Roger C. Taylor. LB

Subject	Page	Code
ANALYSIS, GENERAL		
Thermal Mapping of Streams From Airborne Radiometric Scanning	15	7.9
Testing Plant Materials for Detection of Oxygen-Deficient Water in Ponds	16	7.9
ANALYSIS, INORGANIC		
Methylmercury in Fish. A Toxicologic-Epidemiologic Evaluation of Risks	16	7.42
ANALYSIS, ORGANIC		
Method for Gas Chromatographic Analysis of Fatty Acid Composition of Glycerides Containing Short-Chain Fatty Acids	13	4.11
Application of Non-Aqueous Coulometry for the Analysis of Oil and Petroleum Products	14	4.11
Enzymic Digestion in vitro of Animal Proteins. II. Digestibility of Raw Fish as Well as Fish Subjected to Thermal Treatment	15	7.51
Accelerated Method for Determining the Fat Content in Fish Meal	15	7.53
A Simplified Method for the Evaluation of Antioxidants	15	7.595
APPARATUS AND EQUIPMENT		
Sea-Fishery and Ice Manufacture for the Supply of Fishery Transport Vehicles and Icing of Landed Fish	5	0.8
AUTHOR INDEX	28	
BACTERIOLOGY		
Factors Affecting the Germination of Spores of Clostridium botulinum Type E	12	2.05
BIOCHEMISTRY AND METABOLISM OF FISH		
Gill Sampling as a Method of Following Biochemical Changes: ATPase Activities Altered by Ouabain Injection and Salt Water Adaptation	17	9.13
Uptake of ^{137}Cs in Some Marine Animals in Relation to Temperature, Salinity, Weight and Moulting	17	9.13
The Changes in the Non-Protein Nitrogeneous Constituents of Muscle During the Adaptation of the Eel Anguilla anguilla L. From Fresh Water to Sea Water	18	9.13
Glycolysis and Gluconeogenesis in the Giant Scallop, Placopecten magellanicus (Gmelin)	18	9.13
The Relation Between Exercise and Biochemical Changes in Red and White Muscle and Liver in the Jack Mackerel, Trachurus symmetricus	19	9.13
BYPRODUCTS, MISCELLANEOUS		
Scientists Search for Drugs From the Sea	16	6.60
Whale Heparin (pat.)	16	6.72
CHEMISTRY AND BIOCHEMISTRY		
Membrane Structure Proteins	1	0.32
Comparison of Myoglobins From Harbor Seal, Porpoise, and Sperm Whale. VII. Mechanism and Catalysis for Addition of Cyanide to Myoglobins	1	0.321
Redox Equilibrium of Sperm-Whale Myoglobin, Aplysia Myoglobin, and Chironomus thummi Hemoglobin	1	0.35
Enzyme System Involved in the Decomposition of Phenyl Mercuric Acetate by Mercury-Resistant Pseudomonas	1	0.38
Studies of Invertebrate Fibrinogen. II. Transformation of Lobster Fibrinogen into Fibrin	2	0.35
Icelike Cell Water Shakes Biotheories	2	0.37
Carp Muscle Cathepsins	2	0.38
Studies on the Sulfite Reducing System of Algae. Part II. Purification and Properties of the Reduced Methyl Viologen-Linked Sulfite Reductase From a Red Alga, Porphyra yezoensis	2	0.38
Metals as Constituents of Enzymes	2	0.39
Occurrence of a New Enzyme Reducing Metmyoglobin in Dolphin Muscle	3	0.38
Alginases of Marine Invertebrates	4	0.38
Ribonucleic Acid Synthesis by Salmon [Rainbow Trout] Liver Nuclei	4	0.38
CHILLED FISH		
Chilling Food (pat.)	12	2.08
COMPOSITION, GENERAL		
Nutrient Analysis of Aerospace Foods	16	8.
HANDLING FRESH FISH		
Fish Filleting Machine With Adjustable Cutters (pat.)	10	2.3
Installation for Positioning and Conveying Fishes Before Head-Cutting	10	2.3
Texan Designs Unit To Sort Fish, Add to U. S. Fish Meal Production	11	2.15
LOBSTERS		
[Data on the Cearán Spiny Lobster Fleet, 1966-1968]	7	1.87
[Notes on the Palinuridae of Northeast Brazil (Crustacea, Decapoda, Macrura)]	7	1.87
[Studies of the Biology of the Spiny-Lobster Fishery in Ceará, Data for 1968]	7	1.87
[Color Scale for Determination of the Reproductive Cycle of the Spiny Lobster Panulirus argus (Latr.) in the Caribbean Area]	8	1.87
[Study of the Spiny Lobster Fishery in Ceará for 1969]	8	1.87
MACKEREL		
Relation Between the Catch and the Sea Conditions at Mackerel Angling Grounds	6	1.11
MARINE PLANT PRODUCTS		
The Distribution of Sterols in Algae	15	6.32
MARKETING		
Live Weight-Dressed Weight Relationship for Commercial Fishes From Four Oklahoma Reservoirs	12	2.6
Sell More Trout	12	2.6
NUTRITION AND MEDICINE, GENERAL		
A Drug for Bends	3	0.4
Useful 'Red Tide'	3	0.4
Free Radical Pathology	4	0.4
The Formation of Nitrosamines by Human Intestinal Bacteria	4	0.4
Protein and Calorie Requirements	5	0.7
OCEANOGRAPHY		
The Ocean	24	9.11
OILS, CHEMICAL AND PHYSICAL PROPERTIES		
Photochemical Reactions of Unsaturated Fatty Acid Methyl Esters. II. Photo-Dimerization Reactions of Methyl 8-Eleostearate in CCl_4 and CCl_3H Solutions	14	4.29
OILS, UTILIZATION AND MARKETING		
Synthesis of Polyimides Based on Polyunsaturated Fish Oil Esters	14	4.89
OXIDATION		
Lipid Autoxidation in Freeze-Dried Meats	13	4.5
Oxidation at Intermediate Moisture Contents	14	4.5
OYSTERS		
A Survey of the Oyster and Oyster Shell Resources of Alabama	7	1.81
PACKAGING		
The Protection of Packaged Foods From Insect Attack (Trials Using Pyrethrum, Synergised Pyrethrins and Carbaryl as Paper Coatings)	13	3.2389
Application of Polymers in the Fish Industry	14	3.2380
PERIODICALS AND BOOKS		
New Publication Series	23	9.6
Yearbook Issue, 1971 [National Fisherman]	25	9.6
POLLUTION		
Summary of Interim Guidelines for Disposal of Surplus or Waste Pesticides and Pesticide Containers	19	9.19
Biological Method Tests River Pollution	20	9.19
Selenium and Sulfur in a Greenland Ice Sheet: Relation to Fossil Fuel Combustion	20	9.19
Water Gets Worse	20	9.19
A Proposal: Exchange Equilibria Control the Degree Chlorinated Hydrocarbons Are Biologically Magnified in Lentic Environments	21	9.19
Thermal Pollution -- A Cause for Concern	21	9.19
The Uptake and Distribution of Chlorinated Residues by Goldfish (Carassius auratus) Fed a ^{14}C-Dieldrin Contaminated Diet	21	9.19

C.F.T.R.I. Fish Technology

COMPOSITION, ORGANIC
Composition of Wax Esters, Triglycerides and Diacyl Glyceryl Ethers in the Jaw and Blubber Fats of the Amazon River Dolphin (Inia geoffrensis) 13 4.14
Fish Cutaneous Mucus: A New Source of Skin Surface Lipid 14 4.13
Biosynthesis of Astaxanthin. III. Carotenoids in Sea Breams 16 8.59
Seasonal Variation in Protein Content of Bluegill Pituitary Glands 17 8.51
CONSERVATION
Coastal Land Resources Conference - Conference Proceedings 23 9.6
Vida Silvestre, No. 1 (March 1971) 25 9.17
COOKERY
Food Seasonings (pat.) 11 2.8
Science of Deep Fat Frying 11 2.8
ECONOMICS AND STATISTICS
Fishery-Advisory Information Available to Tropical Pacific Tuna Fleet via Radio Facsimile Broadcast 21 9.2
The State of Food and Agriculture, 1969 22 9.2
International Marketing Information Service. Country Market Digest 25 9.2
Overseas Business Reports 25 9.2
ENGINEERING
Automatic De-Icing (pat.) 6 0.8
Cooling Water Recirculation 6 0.8
EUROPEAN FISHERIES, UNITED KINGDOM
Cornish Crawfish Investigations 8 1.0146
EXPLORATORY FISHING
Exploratory Fishing for Southern Sea Bass, Centropristes striatus melanus, in the Northeastern Gulf of Mexico 11 2.12
FAO Discusses Use of Submersibles for Undersea-Research 12 2.12
FISH CULTURE
Cattle Preconditioning, Catfish Complement Texas Firm's Grass Operation 19 9.16
The Culture and Maintenance of the Loliginid Squids Sepioterethis sepioidea and Doryteuthis plei 19 9.16
[Aspects of Raising Carp, Cyprinus carpio] 20 9.16
The Transplanting and Survival of Turtle Grass, Thalassia testudinum, in Boca Ciega Bay, Florida 20 9.16
FISHERY BIOLOGY AND ICHTHYOLOGY
Lotic Biology 17 9.1
Common Food Fishes of Taiwan 17 9.10
Man-Made Reefs 18 9.10
A Preliminary Study of Canandaigua Lake in 1970 18 9.10
Self Righting by Tridacnid Clams 18 9.12
Protection of Hermit Crabs (Dardanus spp.) From Octopus by Commensal Sea Anemones (Calliactis spp.) 20 9.12
FISHERY EDUCATION
Directory of Engineering College Research and Graduate Study 23 9.7
World Food Problems-Bibliography 24 9.6
Food Industry Source Book for Communication 24 9.7
FISHING CONCERNS AND AGENCIES
Oceanology Directory 25 9.4
FOOD TECHNOLOGY
Food Enzymes 2 0.38
Flavor Technology 1971 3 0.6
Fabricated Foods 4 0.6
Treating Meat and Fish To Confer an Agreeable Aroma (pat.) 4 0.6
FRESHNESS OF FISH
Comparison of Extract-Release Volume, pH, and Agar Plate Count of Shrimp 15 7.80
Simple and Rapid Method for Estimating the Freshness of Fish 16 7.879
FROZEN FISH, PROCESSING
Freezing by Halogenated Hydrocarbons 12 3.2342
GEAR, FISHING
Encyclopedia of Knots and Fancy Rope Work 9 2.1114
Electronic Aids to Navigation 9 2.116
Acoustic Gear Broadens Range of Fisheries Research 10 2.116
POLLUTION--Continued
[Behavior of Fishes in Relation to Pollution] 22 9.19
Flocculation Treatment of Radioactive Contaminated Sea Water. I. Experimental Studies on Flocculants 22 9.19
Toxicity of Pesticides Labelled With Radionuclides 22 9.19
Uptake of Mercury (^{203}Hg) by Tapes decussatus L. 22 9.19
REGULATION AND INSPECTION
Manipulation of Fish Populations With Respect to Food Production: A Cautionary Note 23 9.3
Salvage Law 23 9.3
International Regulation of the Oceans and Their Resources 25 9.3
ROCKFISH AND ROSEFISH
[Age and Growth of Lane Snapper, Lutjanus synagris (Linnaeus), in Northeast Brazil] 5 1.4
[Study of the Fishery Biology of the Caribbean Red Snapper, Lutjanus purpureus Poey, in Northeast Brazil -- Data From 1969] 6 1.4
SAFETY AT SEA
Safety on Fishing Vessels 10 2.119
SHARKS
[Australian Shark Fishery]
Australian Shark Fishery: Methods and Gear 5 1.70
Edible Sharks 5 1.70
Sharks Important to Fishing Industry 5 1.70
SHELLFISH AND CRUSTACEANS, MISCELLANEOUS
[Fourth Contribution to the Inventory of the Marine Decapod Crustaceans From Northeast Brazil] 6 1.80
[Marine Mollusks From North and Northeast Brazil. II.- Mollusks From the Archipelago of Fernando de Noronha (With Some References to the Atoll of Rocas)] 8 1.80
SPOILAGE
Spoilage of Shark 9 2.00
[Bacteriological Contamination of Fishes of the Genus Lutjanus Bloch in Northeast Brazil] 10 2.01
Influence of Temperature Changes on Enzymes of Fish Muscles. Experiments With Golden Orfs Idus idus 10 2.03
STURGEON
[Production and Stocks of Sturgeon Throughout the World] 9 1.9
TOXICITY
Purification and Chemical Studies of a Toxin From the Venom of Lapemis hardwickii (Hardwick's Sea Snake) 11 2.9
Fishes in Pest Situations 12 2.9
VESSELS, FISHING
Open-Hold Rock Lobster Catcher Sails to Tristan 9 2.117

Author	Page	Code
Ackman, R. G.	13	4.14
Alegría C., José Rafael	5	1.4
Ando, Yoshiaki	12	2.05
Antikhovich, V. V.	15	7.53
Antonini, Eraldo	1	0.35
Atwell, B. Houston	15	7.9
Balamutov, A. S.	14	3.2380
Ball, Robert C.	21	9.19
Bartolucci, Luis A.	15	7.9
Berger, K. G.	11	2.8
Berglund, Fredrik	16	7.42
Berlin, Maths	16	7.42
Bezerra, Roberto Cláudio F.	10	2.01
Birke, Gunnar	16	7.42
Boykin, John E.	19	9.16
Branco, Samuel Murgel	22	9.19
Brown, Bradford E.	12	2.6
Brudastova, M. A.	14	3.2380
Brunori, Maurizio	1	0.35
Buczynska, Zofia	15	7.51
Buesa Más, René J.	8	1.87
Buzzard, H. W., Jr.	24	9.7
Cairns, John, Jr.	21	9.19
Caland-Noronha, Maria da C.	10	2.01
Calhoun, John C., Jr.	23	9.6
Cederlof, Rune	16	7.42
Chapin, Roy E.	16	8.
Chen, Tung-Pai	17	9.10
Chichester, Clinton O.	16	8.59
Chipault, Jacques R.	13	4.5
Clapp, D.	24	9.7
Colley, L.	18	9.13
Cordes, Eugene H.	1	0.321
Costa, Ayrton Fernandes da	7	1.87
Costa, Raimundo Saraiva da	7	1.87
Criddle, R. S.	1	0.32
De Becze, George I.	2	0.38
Dendy, J. S.	16	7.9
Doolittle, R. F.	2	0.35
Eaton, C. A.	13	4.14
Eaton, Stephen W.	18	9.10
Ebert, Earl E.	18	9.10
Fankboner, Peter V.	18	9.12
Fausto-Filho, José	6	1.80
--	7	1.87
Favorov, V. V.	4	0.38
Feltham, L. A. W.	18	9.13
Flechtenmacher, W.	5	0.8
Fonteles-Filho, Antônio A.	6	1.4
Friberg, Lars	16	7.42
Fujikawa, Takuma	13	4.11
Fuller, G. M.	2	0.35
Fuller, Nathan S. (ed.)	25	9.6
Furukawa, Kensuke	1	0.38
Fuss, Charles M., Jr.	20	9.16
Gardner, Linda	4	0.38
Given, Robert R.	18	9.10
Glicksman, Martin	4	0.6
Godcharles, Mark F.	11	2.12
Goldberg, Edward D.	20	9.19
Golovin, A. N.	15	7.53
Graumont, Raoul	9	2.1114
Grzenda, Alfred R.	21	9.19
Gurd, Frank R. N.	1	0.321
Hall, John R.	20	9.16
Hamashima, Morio	13	4.11
Hamelink, Jerry L.	21	9.19
Hansen, G.	24	9.7
Hartmann, F.	10	2.3
Hashimoto, Tetsutaro	14	4.29
Hawkins, John M.	13	4.5
Hawksworth, Gabrielle	4	0.4
Heidelbaugh, N. D.	14	4.5
Henry, Richard P.	14	4.89
Hensel, John	9	2.1114
Hepper, B. T.	8	1.0146
Hill, G. B.	6	0.8
Hill, M. J.	4	0.4
Hirata, Kenji	16	8.59
Holmstedt, Bo	16	7.42
Hong, Bor-Shyue	11	2.9
Huggins, A. K.	18	9.13
Hughes, W. D.	5	1.70
Hunter, John R.	19	9.13
Hynes, H. B. N.	17	9.1
Iida, Hiroo	12	2.05
Ilyukhin, A. I.	14	3.2380
James, D. G.	9	2.00
Jelisavčić, Olga	17	9.13
Jonsson, Erland	16	7.42
Kaplan, David M.	1	0.32
Karel, M.	14	4.5
Katayama, Teruhisa	16	8.59
Kelly, John A., Jr.	20	9.16
Kempf, Marc	8	1.80
Kobayashi, Hiroshi	16	7.879
Koide, Minoru	20	9.19
Kotoku, Toshimitsu (pat.)	16	6.72
Krauze, Stanislaw	15	7.51
Kuennemann, H.	10	2.03
Laarman, Percy W.	17	8.51
Labuza, T. P.	14	4.5
Langbridge, D. M.	13	3.2389
La Roe, E. T.	19	9.16
Lasker, Reuben	19	9.13
Laudien, H.	10	2.03
Laurs, R. Michael	21	9.2
Lennon, Robert E.	12	2.9
Lewis, C. C., Jr.	23	9.3
Lewis, R. W.	14	4.13
Litchfield, Carter	13	4.14
López Serrano, Fernando (ed.)	25	9.17
Lucu, Čedomil	17	9.13
Lundeen, B.	24	9.6
Lundeen, G. A.	24	9.6
Luning, K.	16	7.42
MacDonald, R. B.	15	7.9
Manea, Gheorghe	9	1.9
Marriott, John	9	2.116
Matsuura, Fumio	3	0.38
Matthews, Henry Ramos	8	1.80
May, Edwin B.	7	1.81
McLain, L. R.	17	9.13
Menezes, Mariana F. de	5	1.4
Mensinger, Gary	12	2.6
Michael, J.	10	2.3
Miller, H. E.	15	7.595
Miyake, Shingo	14	4.11
Moffett, Lesley Jan	18	9.10
Moore, Jerry L.	16	8.
Mota Alves, Maria Ivone	8	1.87
Nagaoka, Y.	22	9.19
Nickelson, R.	15	7.80
Nicol, B. M.	5	0.7
O'Doherty, P. J. A.	18	9.13
Oledzka, Regina	15	7.51
Olley, June	9	2.00
Omori, Dairiku	11	2.8
Paiva, Melquíades Pinto	7	1.87
--	8	1.87
Paris, Doris F.	21	9.19
Patterson, Glenn W.	15	6.32
Pennak, Robert W. (rev.)	17	9.1
Pintauro, N. D.	3	0.6
Pownall, P. C.	5	1.70
Prect, H.	10	2.03
Pritchard, Austin W.	19	9.13
Pryor, William A.	4	0.4
Radiske, C. A.	24	9.7
Revelle, Roger	24	9.11
Robinson, Clay M.	12	2.6
Roger, Alan Barde	4	0.6
Ross, D. M.	20	9.12
Rotilio, Giacomo C.	1	0.35
Saggese, Ughetta	1	0.35
Saito, Eizo	2	0.38
Sakurai, A.	22	9.19
Schwall, Donald V.	4	0.6
Shimizu, Chiaki	3	0.38
Silver, M.	14	4.5
Stempniewski, Hélio Ladislau	20	9.16
Suzuki, Osamu	14	4.29
Takahashi, Toyoo	2	0.38
Tamura, Goro	2	0.38
Tarr, Hugh L. A.	4	0.38
Taylor, William J.	21	9.19
Tonomura, Kenzo	1	0.38
Tu, Anthony T.	11	2.9
Turner, Charles H.	18	9.10
Uchiyama, Hitoshi	16	7.879
Unlu, M. Yasar	22	9.19
Vanderveen, John E.	16	8.
Vanderzant, C.	15	7.80
Vaskovsky, V. E.	4	0.38
Ver Ploeg, Dan A.	1	0.321
Von Euler, Ulf	16	7.42
Wadachi, Y.	22	9.19
Wagner, Michael A.	25	9.3
Walters, Carl J.	23	9.3
Waybrant, Ronald C.	21	9.19
Weiss, Herbert V.	20	9.19
Wortley, G.	22	9.19
Wyman, Jeffries	1	0.35
Yamada, Tetsuo	6	1.11
Yamamoto, Atsushi	11	2.8
Yamasawa, Masakatsu	2	0.38
Yamauchi, Fumio (pat.)	16	6.72
Yasuda, Kōsaku	13	4.11
Yasui, Hiroshi	11	2.8
Yang, Hung-Chia	17	9.10
Yokoyama, Henry	16	8.59
Yoshizawa, Zensaku (pat.)	16	6.72
Zaugg, W. S.	17	9.13

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